User Manual

MicroERD™

Document No. MD5000-01

Final Revision: July 2013

Copyright ©2013 by INBREIN, Inc. All rights reserved.

The information contained in this document is subject to change without notice. The company, organizations, products, persons, and events illustrated in the document are fictional. The contents illustrated in this document are not related to any existing company, organizations, products, persons, or events. The user bears the responsibility to abide by all applicable copyright laws. The use of any part of this document for reproduction exceeding the limitations of the copyright, partial use in a specific system, transmission by a specific format or means (including illegal means in the form of electronic communication, mechanical transmission, photographing, recording), or use for a specific purpose not authorized by INBREIN Inc. ("Inbrein") is prohibited.

Inbrein may have patents, patent application programs, trademarks, copyrights, or intellectual property rights in regards to the matters dealt with in this document. Being in possession of this document without the stipulated license by Inbrein cannot be interpreted as being the provision of the license for the patents, patent application programs, trademarks, copyrights, or intellectual property rights.

MicroERD™ is the trademark of INBREIN registered in the Republic of Korea.

The name of other products and companies mentioned in this document may be trademarks owned by the corresponding parties.

Table of Contents

Starting MicroERD™ 8

MicroERD™ 8

Installation and Execution 9

Installation 9

Run 11

Layout and Features 12

Main Window 12

Window Control 13

Undock Window 13

Dock Window 13

Deactivate Window 14

Activate Window 14

Auto Hide Window 15

Lock Window 16

Project 17

Create Project 17

Save Project 18

Edit Project 18

Open/Close Project 20

Work Window 20

Model Explorer 20

Layout of the Model Explorer 21
Layout of Model Explorer Tree 22
Model Explorer Context Menu 23
Object Property Editor & Minimap 25
Object Property Editor 25
Diagram Minimap 26
Smart Supporters 27
Object Information Viewer 27
Diagram and Object Finder 27
Model Validator 28
Dynamic Help 28
Diagram Layout 29
ER Diagram Area 29
Subject Area 29
Layout of Subject Areas 30
Create Subject Area 30
Rename Subject Area 31
Delete Subject Area 32
ER Diagram Tools 32
ER Diagram Context Menu 34
Diagram Components 34
Entity 34
Entity Context Menu 35

Create Entity 36
Clone Entity 37
Delete Entity 37
Rename Entity 38
Edit Entity Property 38
Attribute 39
Attribute Context Menu 40
Add Attribute 41
Copy Attribute 41
Move Attribute / Change Order 42
Delete Attribute 42
Edit Attribute Format and Description 43
Relationship 43
Create Identity Relationship 45
Create Non-identity Relationship 46
Create Many-to-many Relationship 47
Create Custom Relationship 48
Self-referential Relationship 48
Create Sub-type Relationship 49
Delete relationship 49
Relationship Properties Editor 50
Relationship Context Menu 51
Sub-type Relationship 52

Create Sub-type Relationship 52
Edit Sub-type Property 53
Convert Sub-type to Identity Relationship 54
Roll up sub-type 54
Roll down sub-type 54
Model Management 55
Schema Management 55
Change Model Schema 56
Engineering Function 56
Forward Engineering 57
Reverse Engineering 57
Model Merge 58
Stage 1 of Model Merge 58
Stage 2 of Model Merge 59
Import from File 59
Import from ERWin XML File 60
Import from Excel File 60
Import from MicroERD™ File 62
Functions for PDW/ Azure 62
Types of Tables (Entities) 62
Create PDW/Azure Project 63
Create and Set up Entities 63

Options for PDW V2 Only 66

Replicated, Distributed type SQL 67

Standardization 68

Domain 68

Data Dictionary 69

Registering in Data Dictionary 70

Using Data Dictionary 71

Import from Excel File 71

Export 71

Documentation 71

Model Documentation 72

Standardization Data (Data Dictionary, Domain) Documentation 72

Print 73

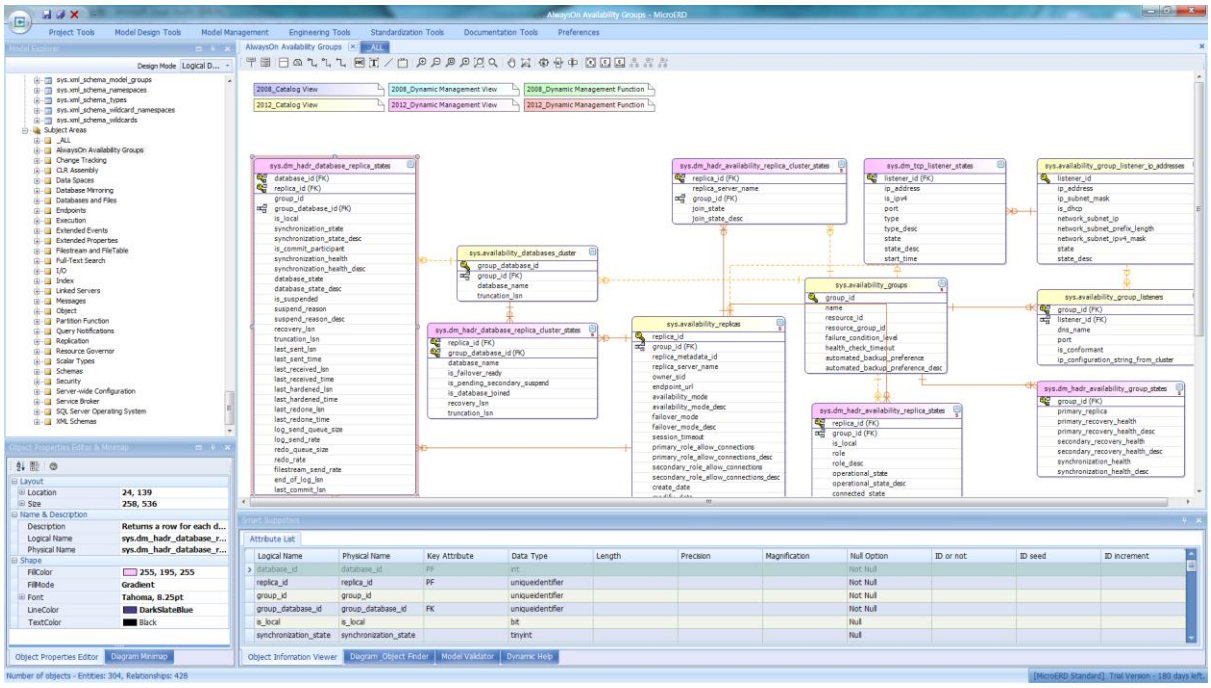
Printer Page Settings 73

Printing and Preview 74

Starting MicroERD™

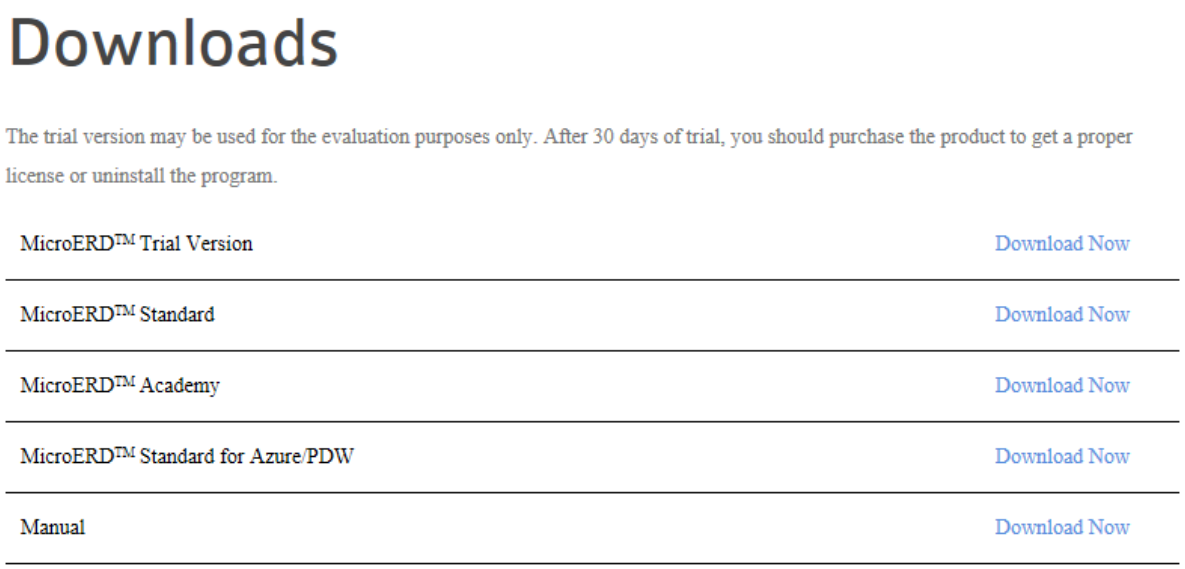
MicroERD™

MicroERD™ provides the tools you need to create a precise data model to reduce data redundancy, improve productivity, and observe standards. By using the UI developed based on extensive user experience, the modeler can work on models easily and conveniently. You can continuously enjoy new and improved functions of MicroERD™ through prompt functional improvements and updates. Also, it provides flexible license options so that it can minimize the burden of expenses on the company looking for a new or additional data modeling tool.



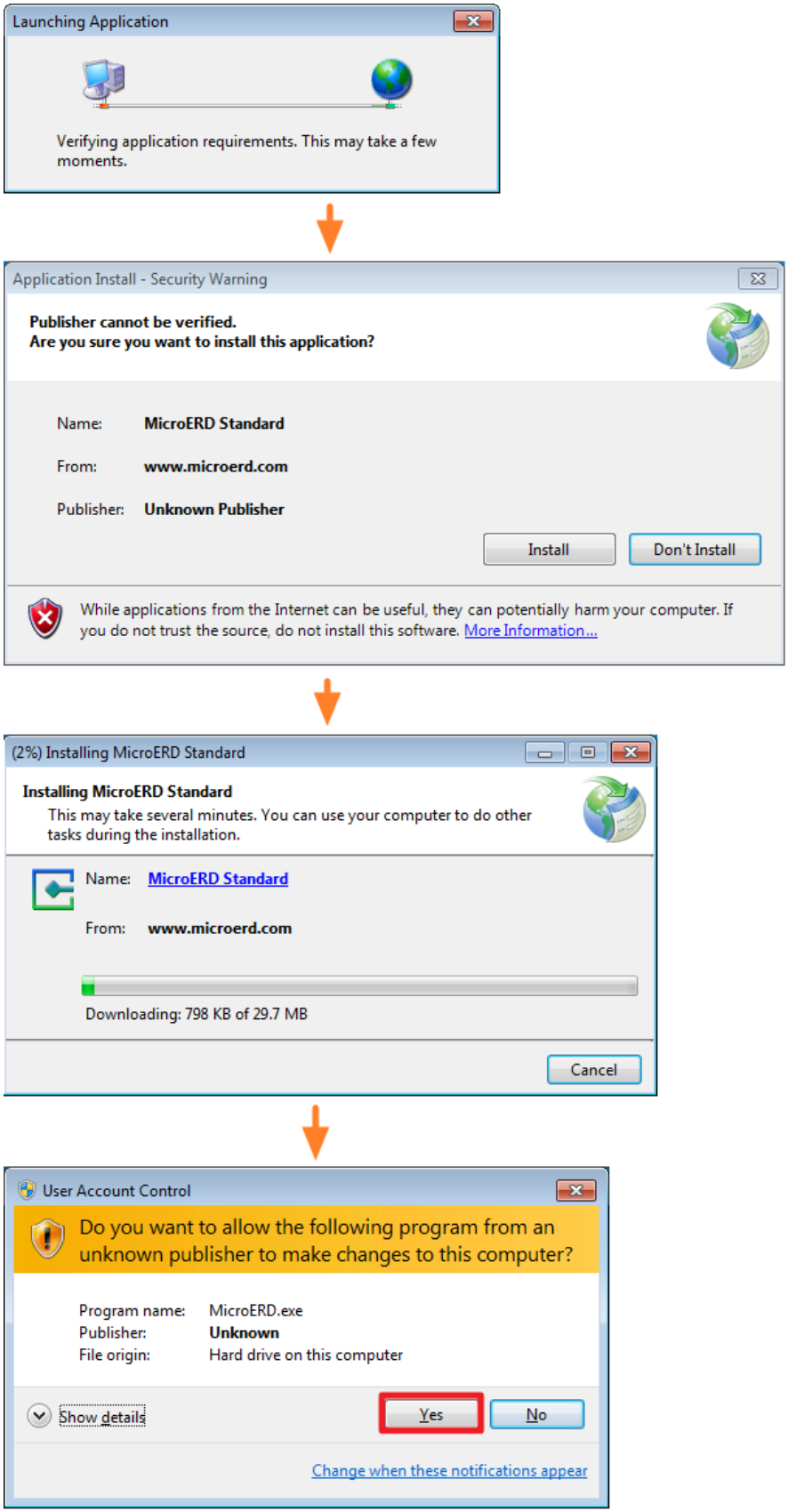
Installation and Execution

Installation


Downloads
The trial version may be used for the evaluation purposes only. After 30 days of trial, you should purchase the product to get a proper license or uninstall the program.
MicroERD™ Trial Version
Download Now
MicroERD™ Standard
Download Now
MicroERD™ Academy
Download Now
MicroERD™ Standard for Azure/PDW
Download Now
Manual
Download Now

MicroERD™ can be downloaded at www.microerd.com.

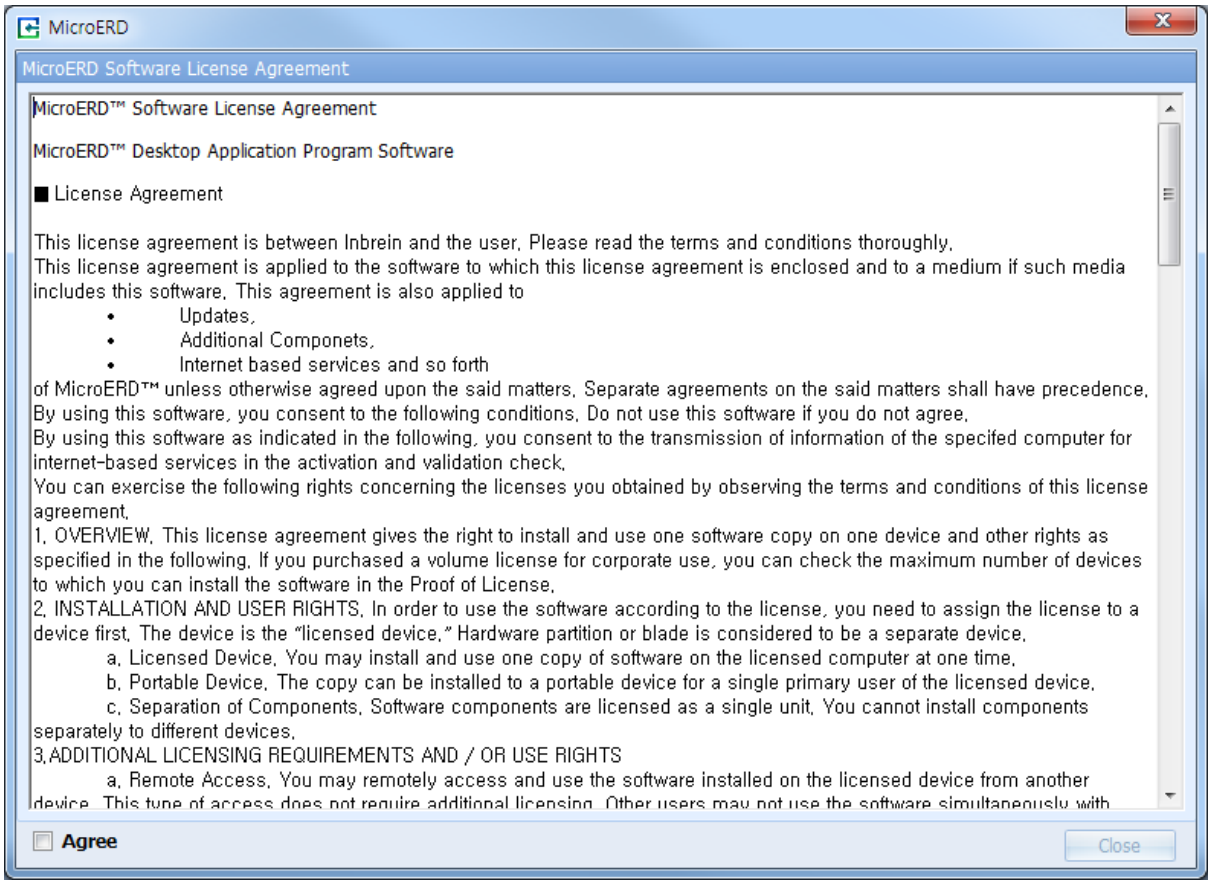
Click the Download button in the homepage to start installation of MicroERD™.


Launching Application
Verifying application requirements. This may take a few moments.
Application Install - Security Warning
Publisher cannot be verified.
Are you sure you want to install this application?
Name: MicroERD Standard
From: www.microerd.com
Publisher: Unknown Publisher
Install
Don't Install
While applications from the Internet can be useful, they can potentially harm your computer. If you do not trust the source, do not install this software. More Information...
(2%) Installing MicroERD Standard
Installing MicroERD Standard
This may take several minutes. You can use your computer to do other tasks during the installation.
Name: MicroERD Standard
From: www.microerd.com
Downloading: 798 KB of 29.7 MB
Cancel
User Account Control
Do you want to allow the following program from an unknown publisher to make changes to this computer?
Program name: MicroERD.exe
Publisher: Unknown
File origin: Hard drive on this computer
Show details
Yes
No
Change when these notifications appear

MicroERD™ requires .Net Framework 3.5 or higher version in the user's PC.

If it is not installed, .Net Framework 3.5 installation window will appear automatically.

Run


MicroERD
MicroERD Software License Agreement
MicroERD™ Software License Agreement
MicroERD™ Desktop Application Program Software
■ License Agreement
This license agreement is between Inbrein and the user, Please read the terms and conditions thoroughly,
This license agreement is applied to the software to which this license agreement is enclosed and to a medium if such media includes this software, This agreement is also applied to
• Updates,
• Additional Componets,
• Internet based services and so forth
of MicroERD™ unless otherwise agreed upon the said matters, Separate agreements on the said matters shall have precedence,
By using this software, you consent to the following conditions, Do not use this software if you do not agree,
By using this software as indicated in the following, you consent to the transmission of information of the specifed computer for internet-based services in the activation and validation check,
You can exercise the following rights concerning the licenses you obtained by observing the terms and conditions of this license agreement,
1, OVERVIEW, This license agreement gives the right to install and use one software copy on one device and other rights as specified in the following, If you purchased a volume license for corporate use, you can check the maximum number of devices to which you can install the software in the Proof of License,
2, INSTALLATION AND USER RIGHTS, In order to use the software according to the license, you need to assign the license to a device first, The device is the "licensed device," Hardware partition or blade is considered to be a separate device,
a, Licensed Device, You may install and use one copy of software on the licensed computer at one time,
b, Portable Device, The copy can be installed to a portable device for a single primary user of the licensed device,
c, Separation of Components, Software components are licensed as a single unit, You cannot install components separately to different devices,
3,ADDITIONAL LICENSING REQUIREMENTS AND / OR USE RIGHTS
a, Remote Access, You may remotely access and use the software installed on the licensed device from another
Agree
Close

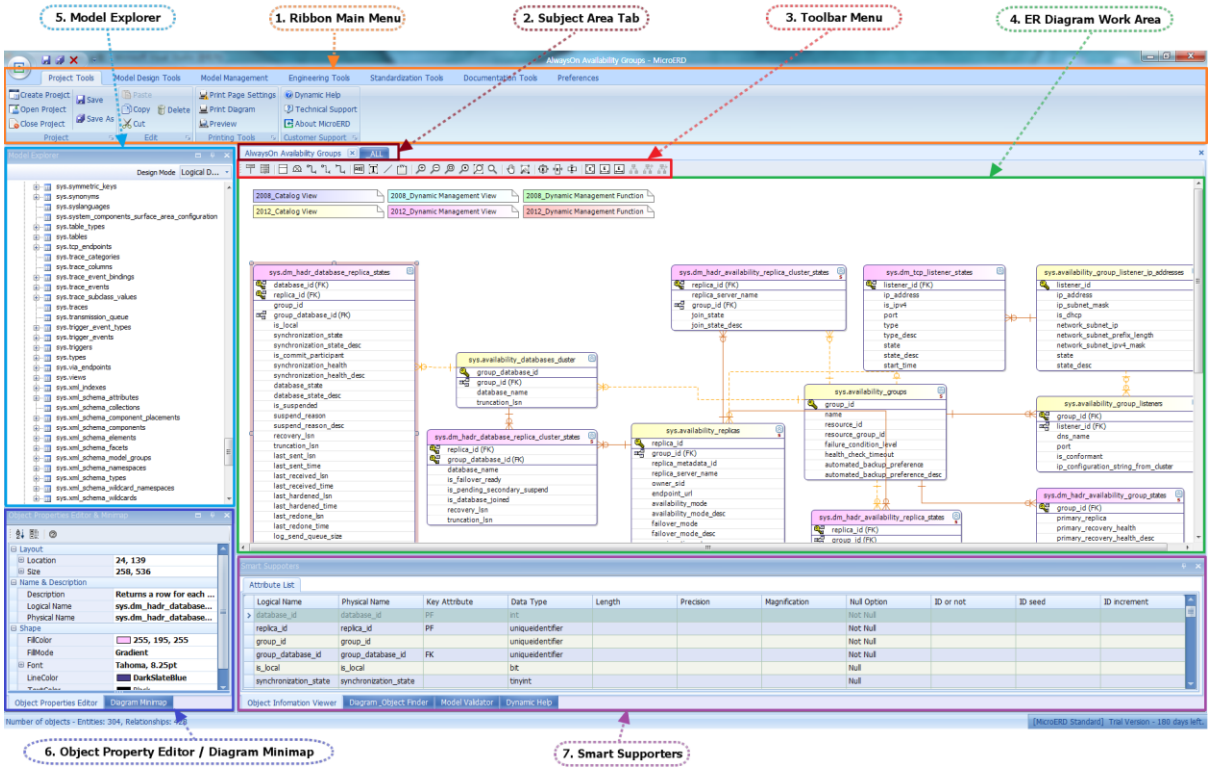
After the installation, MicroERD™ will run for the first time and the **Software License Agreement** will appear on the screen.

Click "Agree" to use MicroERD™.

You can run MicroERD™ any time by clicking on the shortcut icon created on the desktop or through the menu registered on the Windows programs.

Layout and Features

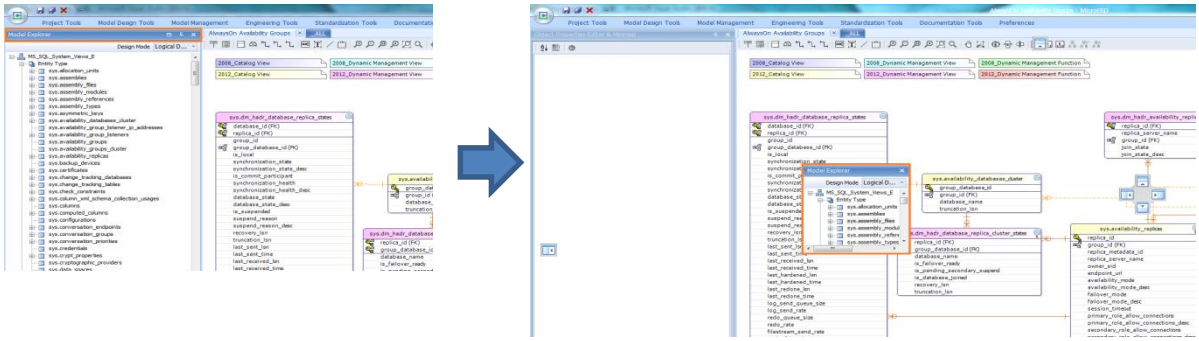
Main Window


5. Model Explorer
1. Ribbon Main Menu
2. Subject Area Tab
3. Toolbar Menu
4. ER Diagram Work Area
6. Object Property Editor / Diagram Minimap
7. Smart Supporters

Item	Description
1. Ribbon Main Menu	Main menu area
2. Subject Area Tab	Area for selecting opened subject areas
3. Toolbar Menu	A group of design tools
4. ER Diagram Work Area	Diagram work area
5. Model Explorer	Area for viewing objects in a tree and easily finding objects
6. Object Property Editor / Diagram Minimap	Area for setting the properties of the object / area for viewing the entire diagram at a glance
7.Smart Supporters	Object information viewer Diagram and object finder Model validator Dynamic help

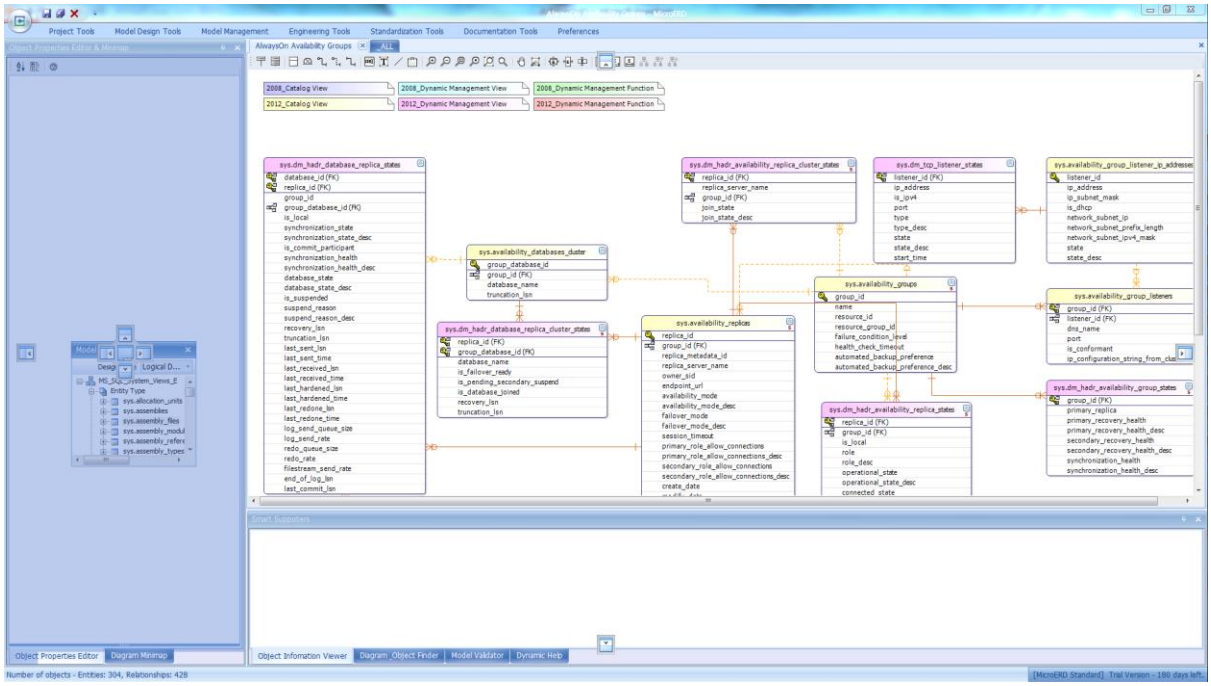
Window Control

Undock Window



Select the window to undock and drag the title area to undock the window.

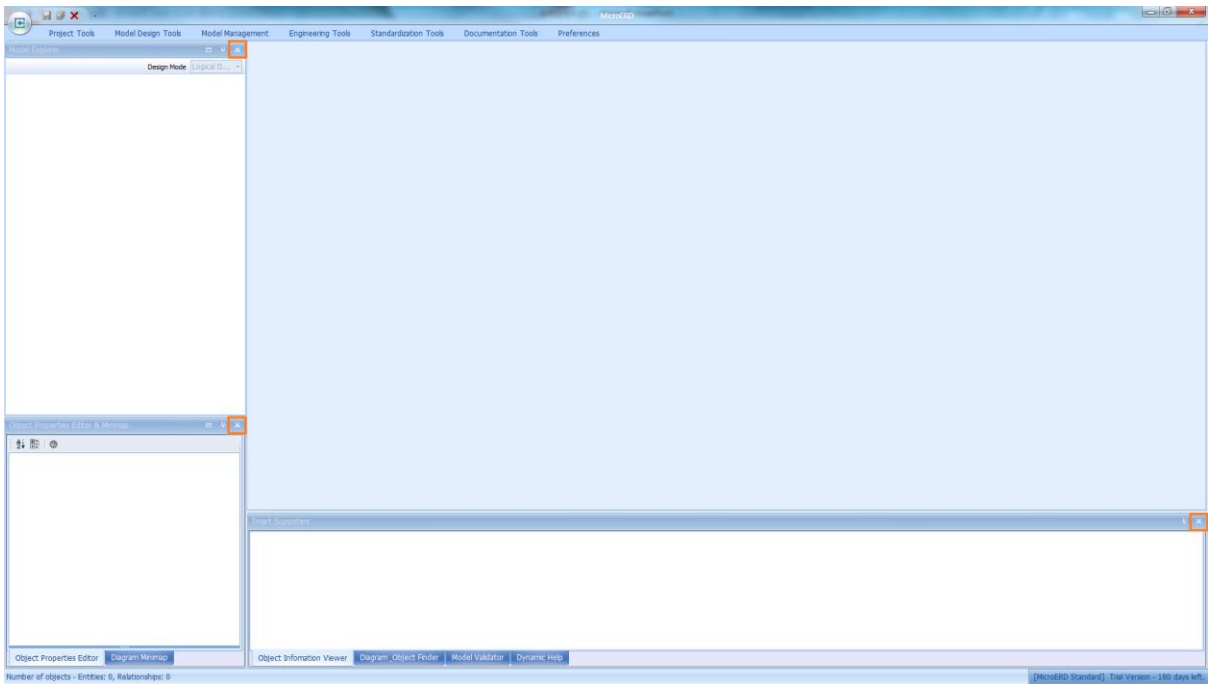
Dock Window



When you drag the undocked window with your mouse, the top/bottom/left/right arrows will appear to indicate possible docking directions.

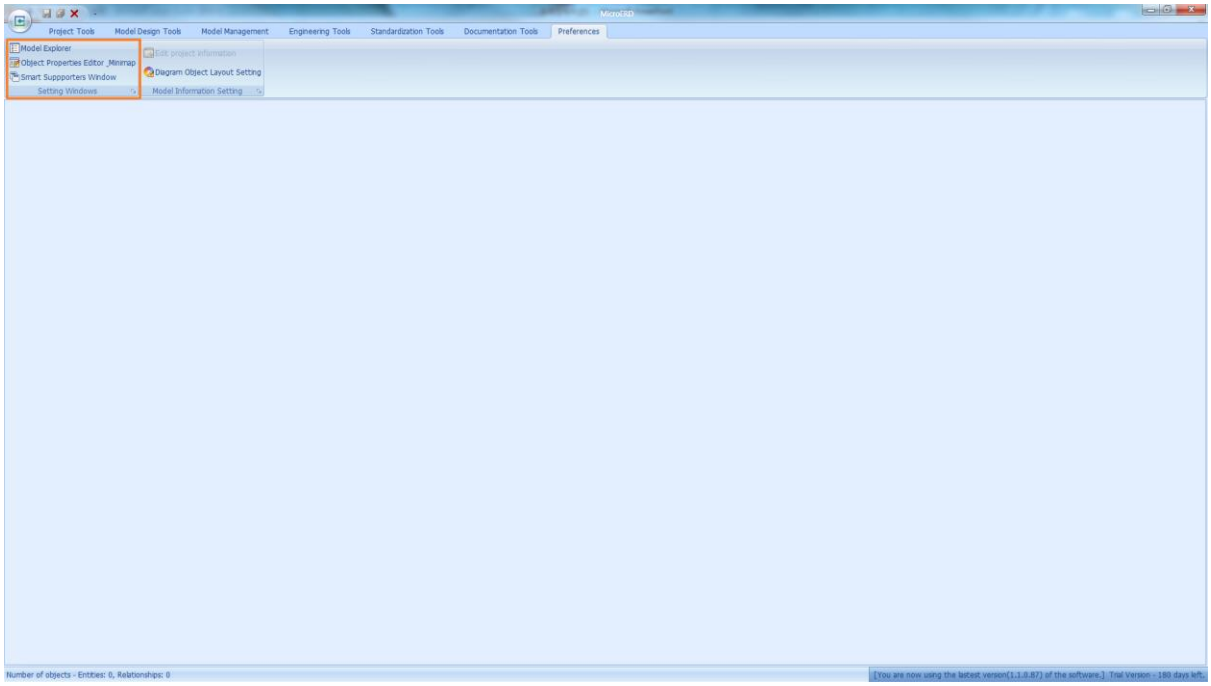
Move the window to the docking position of your preference and then the color will be inverted to indicate the docking position.

Deactivate Window



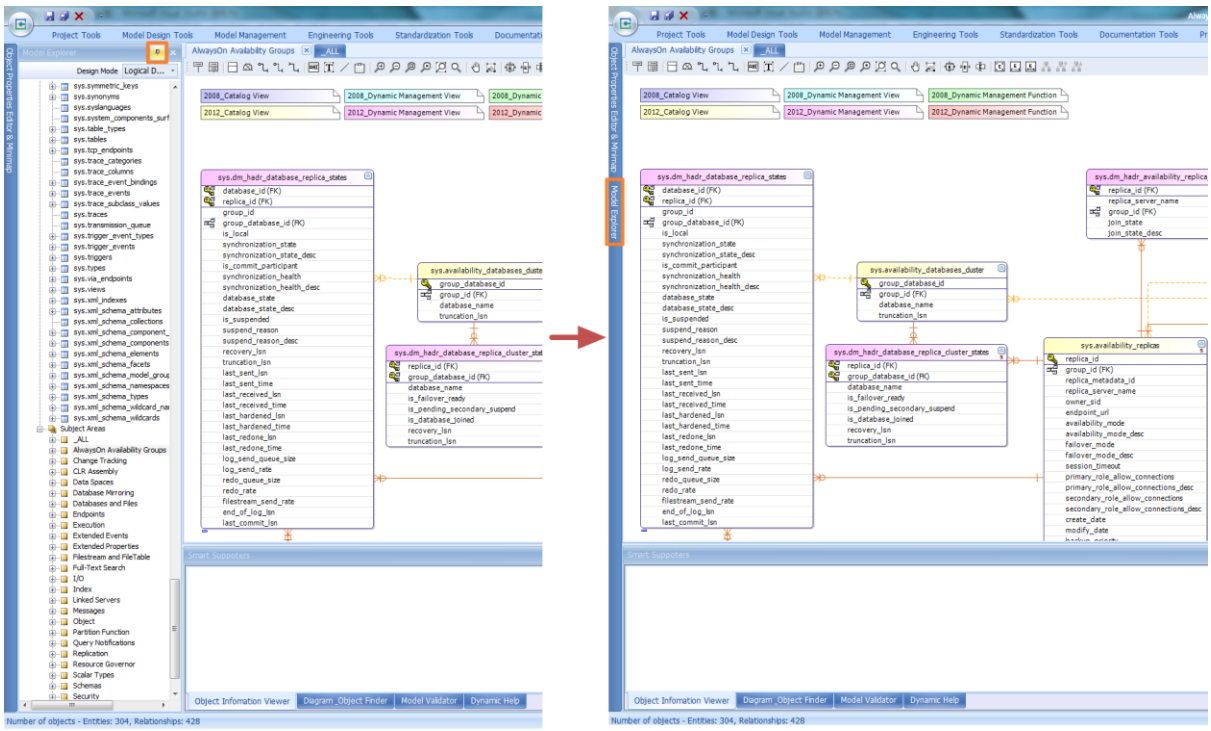
You can deactivate **Model Explorer** / **Object Property Editor & Minimap** / **Smart Supporters** Windows by closing the window by clicking the X (Close) button.

Activate Window



You can activate the deactivated **Model Explorer** / **Object Property Editor & Minimap** / **Smart Supporters** Windows through [Preferences] > [Model Explorer], [Object Property Editor & Minimap], and [Smart Supporters].

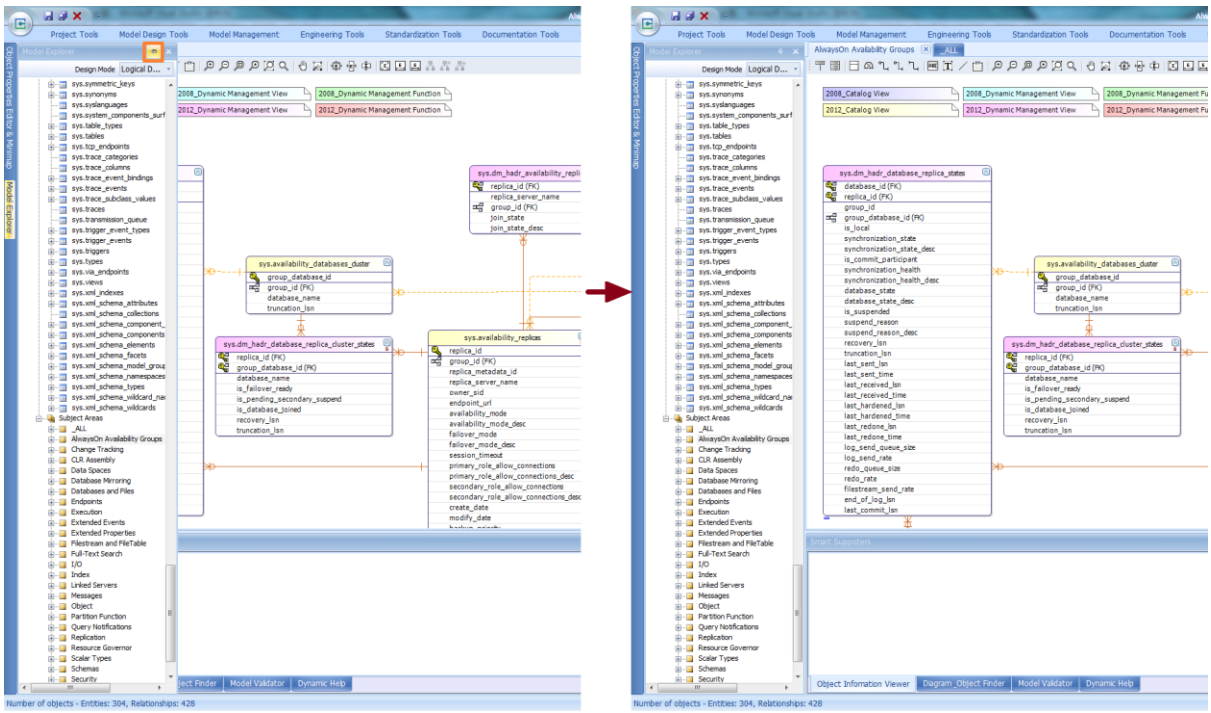
Auto Hide Window



When you click the Auto Hide Window button, the window will be closed as in the picture on the right, only remaining as a menu.

The window will reappear when you place the mouse on the menu and disappear when you place the mouse elsewhere.

Lock Window



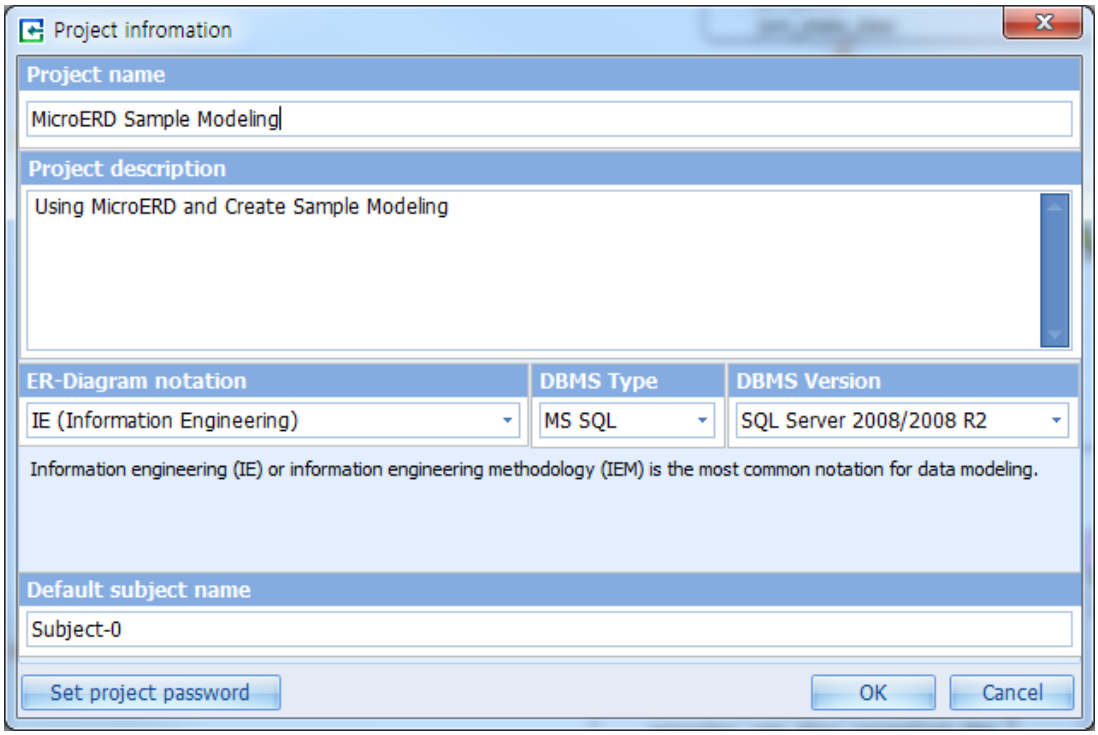
When you place the mouse on the window that is set to Auto Hide, the window will reappear.

Click the Lock button to lock the window to the corresponding position.

Project

Project is the largest work unit. Files are saved by project and you can create a variety of subject areas within the project. Each subject area can include a number of entities.

Create Project



Setting Password
Enter a new password
※ If you do not want to set a password,
click on the OK button without entering anything.
OK
Cancel

Click [Project Tools] > [Create Project] menu. (Ctrl+N)

When the Project Information Window appears, enter 'Project Name' and 'Project Description', and select ER Diagram Notation, DBMS Type, and DBMS Version.

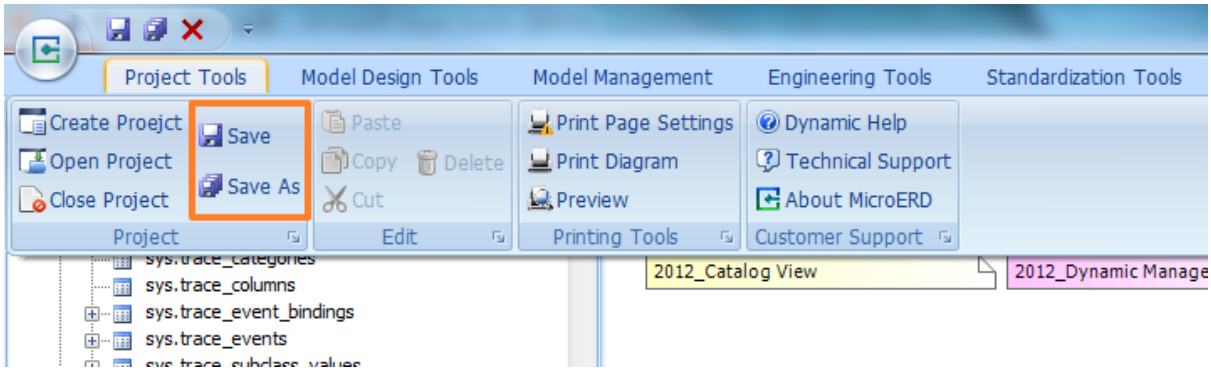
Click the [Set project password] button to set a password for the project.

'Project Description' and 'Set project password' are not mandatory.

Item	Description

Project Name	Project name
Project Description	Description of the project. Not mandatory.
ER Diagram Notation	Standard system or methodology used for the project Choose from IDEF1X (Integration Definition for Information Modeling) and IE (Information Engineering)
DBMS Type	DBMS type to apply
DBMS Version	DBMS version to apply
Default Subject Area Name	Name of the subject area created by default when you create a project. The default value is set to Subject-0.
Set project password	When you set a password to the project, you need to enter the password when you [Open project]. Not mandatory.

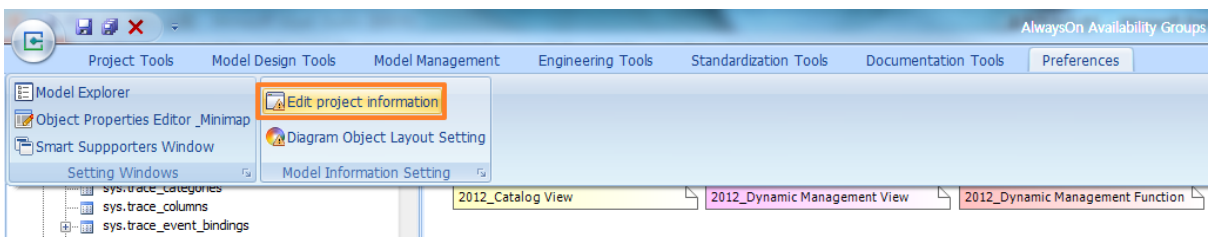
Save Project



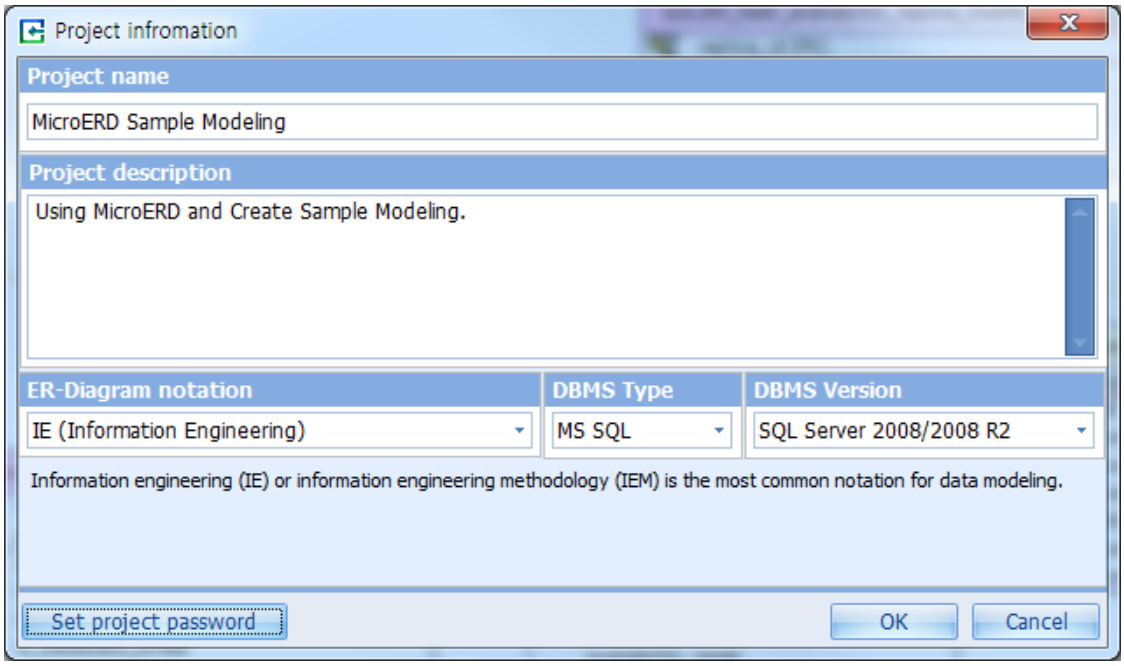
You can save the project by using [Project Tools] > [Save] or [Project Tools] > [Save As]. (Ctrl+S)

You can save the project in the current state using the [Save] menu. When you save the project for the first time or save it by another name, the file name will be set to 'Project Name.mdr' by default and you can edit the name to your preference.

Edit Project

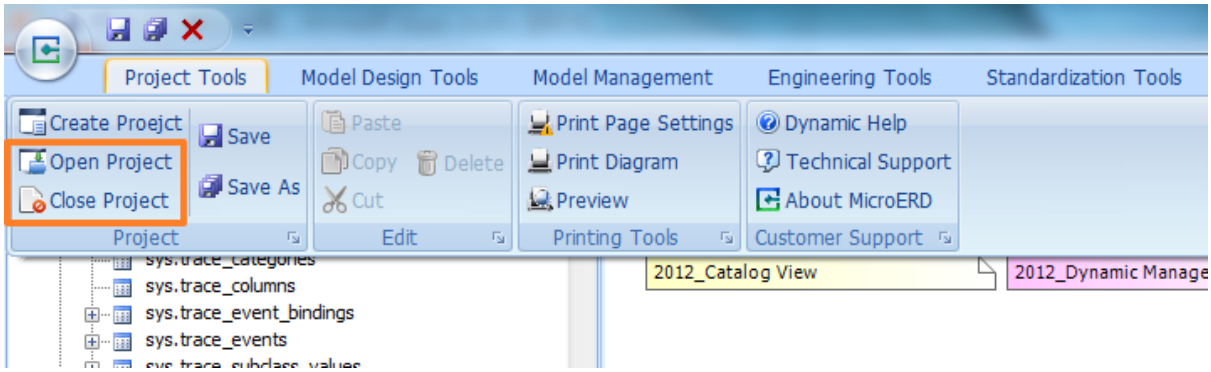


You can edit the project information using [Preferences] > [Edit project information].



Item	Description
Project Name	Edit the project name
Project Description	Edit description about the project
ER Diagram Notation	When you change notation, it is reflected on the project and the diagram will be represented using the changed notation
DBMS Type	Change the DBMS type to be applied. Changed to the data type of the physical model appropriate to the changed type.
DBMS Version	Change the DBMS version to be applied. Changed to the data type of the physical model appropriate to the changed version
Change/cancel project password	If the password is not set, you can set the password, and you can also change or cancel the existing password.

Open/Close Project



You can open existing projects using [Project Tools] > [Open Project]. You can only open files with extension .mdr.

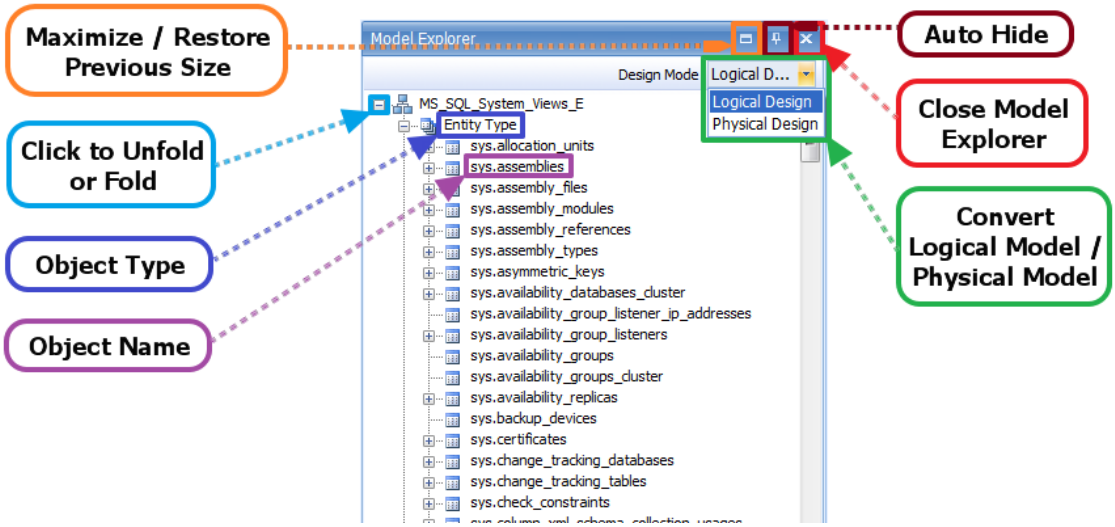
End currently opened projects using [Project Tools] > [Close Project].

Work Window

Model Explorer

This window shows entities and subject areas in a tree structure.
You can see the project, subject area and entities at a glance.
You can carry out logical design and physical design by changing the design mode.

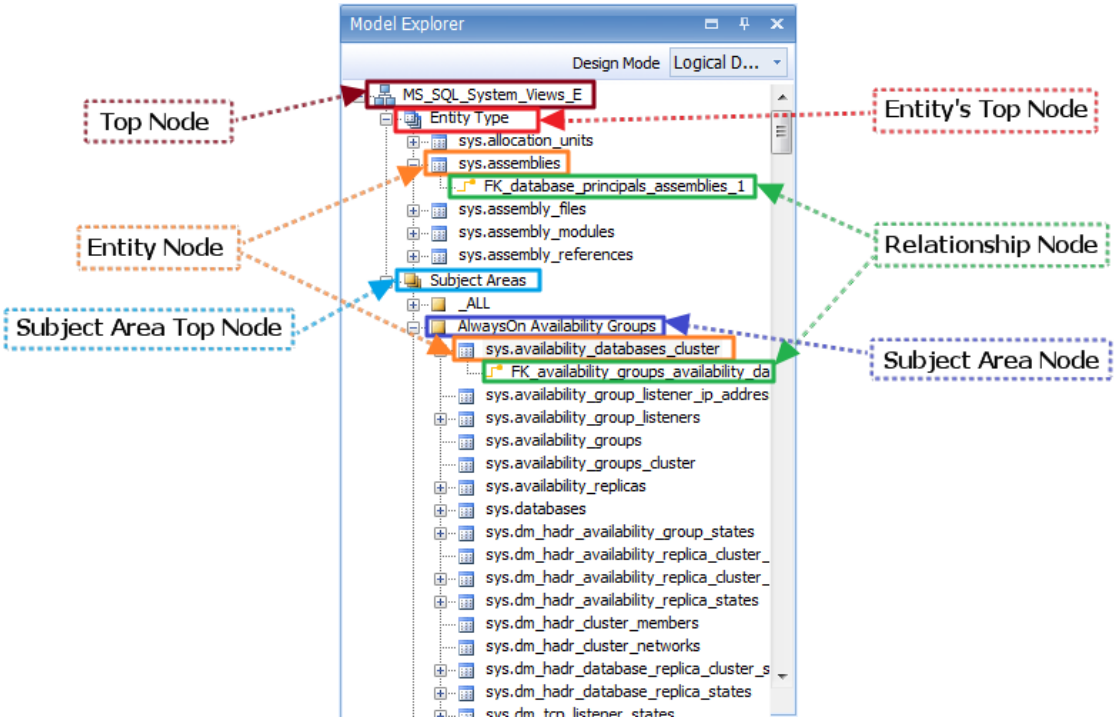
Layout of the Model Explorer



You can see the project, subject area and entities at a glance.

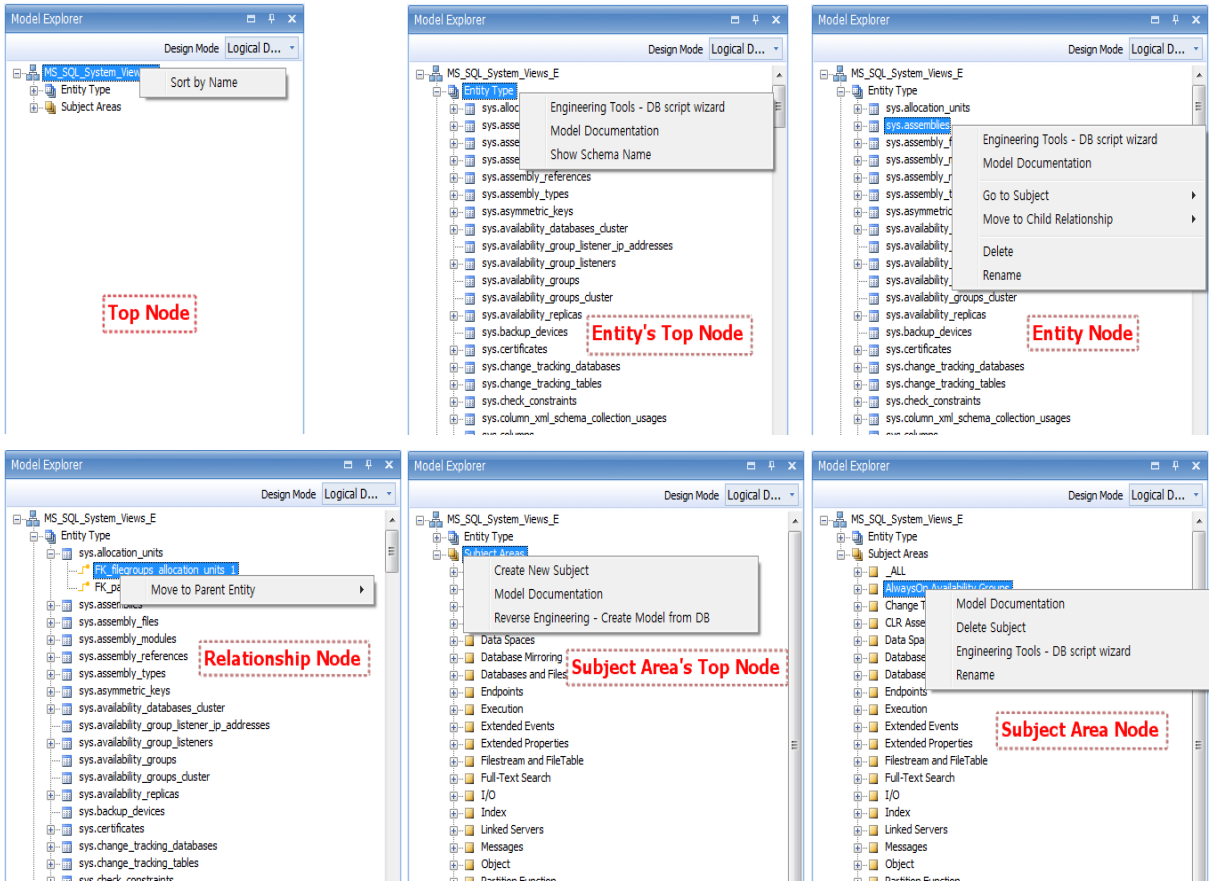
Item	Description
Maximize / Restore Previous Size	Maximize window to the full span of the area to which the model explorer is docked / restore previous size
Auto Hide	Auto hide / lock window
Close Model Explorer	End model explorer window
Convert Logical Model / Physical Model	Change design mode
Click to Unfold or Fold	Fold / unfold tree nodes
Object Type	Different icons are used for different object types
Object Name	Object name

Layout of Model Explorer Tree



Item	Description
Top Node	Project name
Entity's Top Node	Includes all entities in the project
Entity Node	An entity
Relationship Node	Relationship between entities
Subject Area Top Node	A set of subject areas
Subject Area Node	A subject area

Model Explorer Context Menu



You can bring up the executable context menu from each node in the model explorer by right clicking.

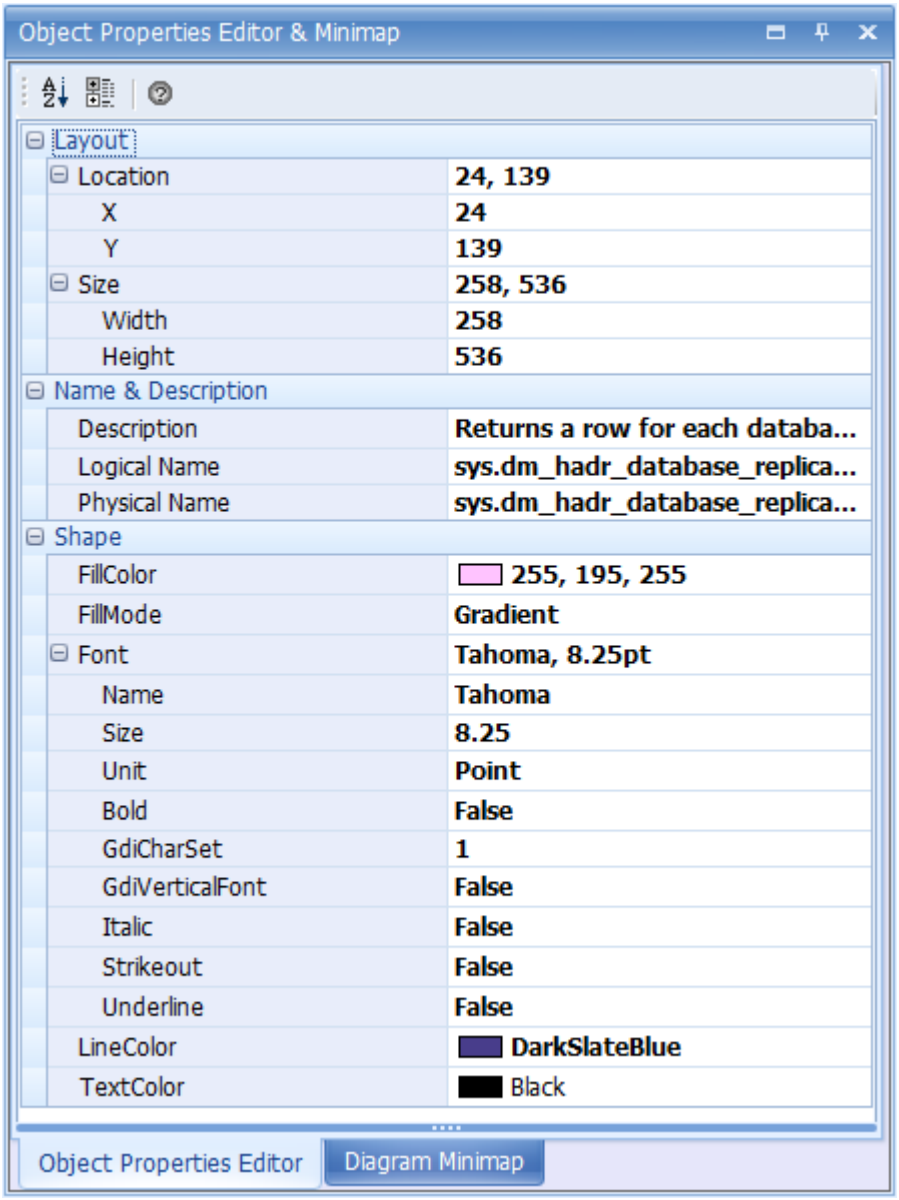
You can work quickly and efficiently using the context menu.

Node	Context Menu	Description
Top Node	Sort by name	Sorts the objects of lower level nodes by name.
Entity's Top Node	Engineering function – Create DB script	Creates DB script for entities.
	Document model	Creates standard document about entities.
	Show schema name	Shows schema names with the entity name.
Entity Node	Engineering function – Create DB script	Creates DB script for entities.
	Document model	Creates standard document about entities.
	Move to subject	Moves to the entity in the corresponding subject area.
	Move to child relationship	Moves to the relationship of the related child entity.

	Delete	Deletes the entity.
	Rename	Renames the entity.
Relationship Node	Move to parent entity	Moves to the relationship of the related parent entity.
Subject Area's Top Node	Create new subject	Adds a new subject area
	Document model	Creates a standard document for the entities included in the corresponding subject area.
	Reverse engineering – Create model from DB	Creates an ER diagram based on the physical database.
Subject Area Node	Document model	Creates a standard document for the entities included in the corresponding subject area. Refer to <9.1 Model Documentation> for details.
	Delete subject	Deletes the subject area.
	Engineering function – Create DB script	Creates DB script for the entities included in the corresponding area.
	Rename	Changes the name of the corresponding subject area.

Object Property Editor & Minimap

Object Property Editor

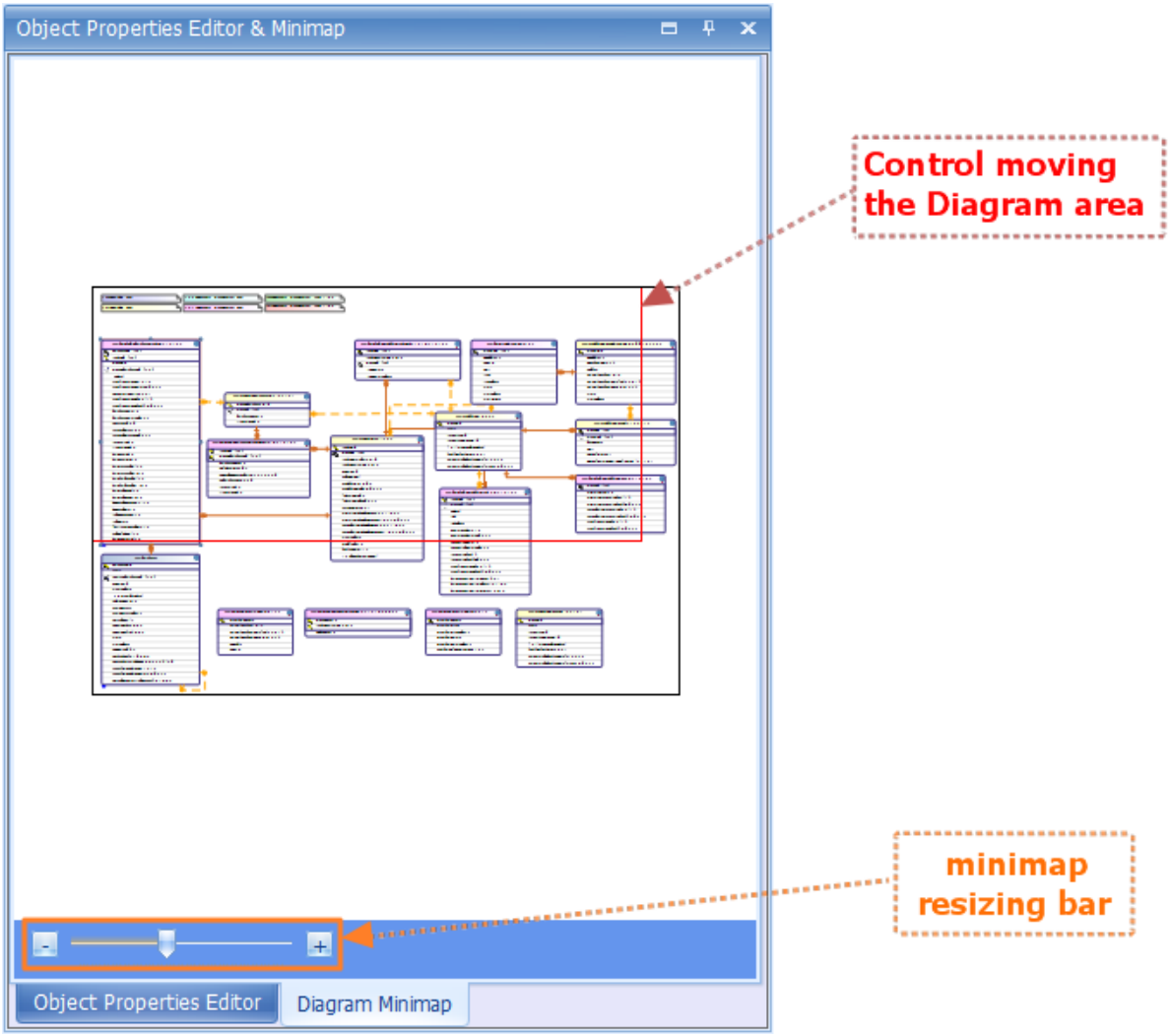


You can select an object such as entity, relationship and node to change its properties such as location, size and font.

Item	Description
Location	Horizontal and vertical coordinates displayed on the screen
Size	Height and width of the diagram
EntityName	Logical name of the currently selected entity

TableName	Physical name of the currently selected entity
Description	Description about the diagram
FillColor	Color to be applied to the diagram
FillMode	Mode that applies the color to diagrams (General, Gradient)
Font	Font to be applied to the diagram
LineColor	Diagram's border color
TextColor	Diagram's text color

Diagram Minimap



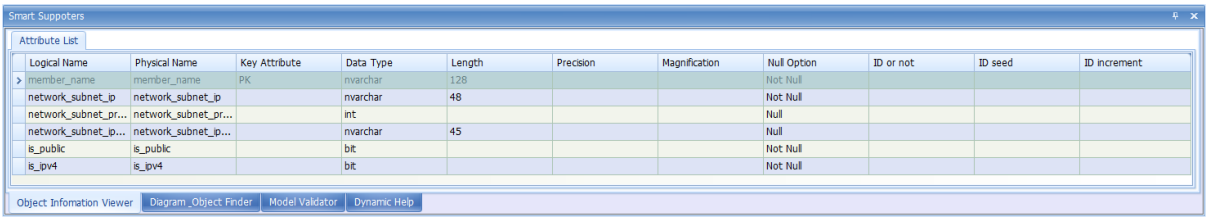
The work area of the diagram is displayed in the form of a minimap.

Move the red rectangle to reposition the view displayed in the work area on the right. You can check the entire work area at a glance using the minimap resizing bar.

Smart Supporters

Smart Supporters is the title used within MicroERD™, and it includes **Object Information Viewer, Diagram and Object Finder, Model Validator, and Dynamic Help.**

Object Information Viewer

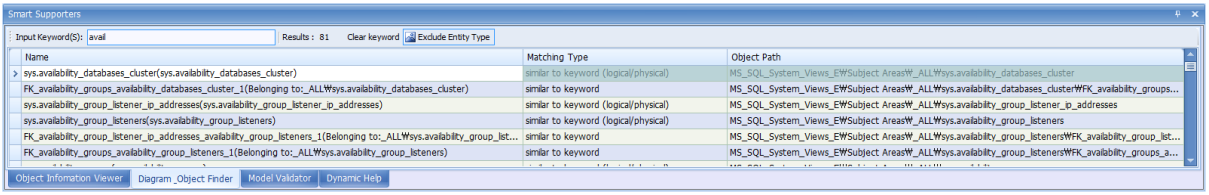


When you select an entity, you can see the attributes of the selected entity.

When you select a relationship, information on the primary key and foreign key is displayed.

The modification of information is disabled; you can only check the information through the viewer.

Diagram and Object Finder

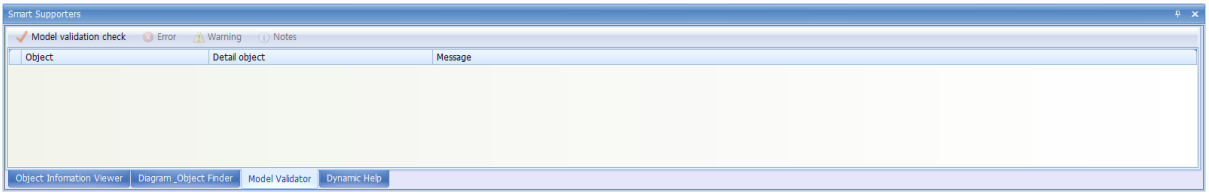


Using the finder, you can quickly find objects including a specific word in the data model.

Item	Description
Enter keyword	Enter the word you wish to search for and press the Enter key
Search result	Number of the objects including the keyword
Erase	Initialize the search result and keyword.
Exclude Entity Type	Exclude the objects of the entity node among search result. It only shows the objects included in the subject area.
Name	Name of the object

Match Type	Exact Match: Exactly matches the keyword Similarity: Includes keyword
Path	Indicates the path of the object within the model explorer.

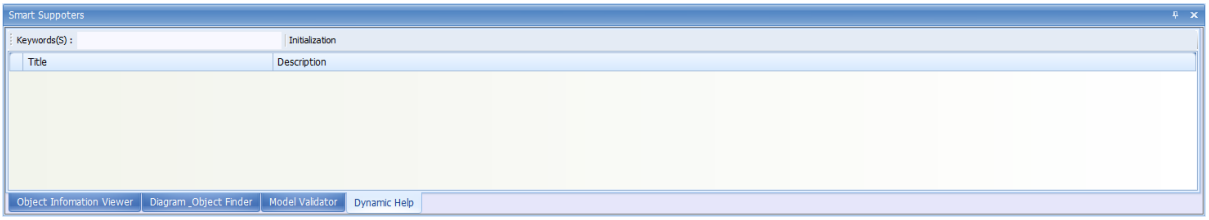
Model Validator



This shows the information and errors pertaining to the entity and relationship.

You can edit incorrect relationships or properties using the model validation function.

Dynamic Help



When you select entity, attribute or relationship, the help file corresponding to the selected object appears.

Item	**Description**
Search Help (S)	Enter keyword and search for help topics.
Initialize	Initializes the queried help and keyword.
Help Topics	Displays topics including the keywords. Double click the corresponding topic to read help in the popup window.
Help Contents	Details of help topics. Double click the topic to bring up help in the pop-up window.

Diagram Layout

ER Diagram Area

You need one or more subject areas in order to start the ER diagram.

When you create a project for the first time, a default subject area named 'Subject-0' will be created and the name can be edited.

A project must be created for you to work with the ER diagram. For details, refer to the <Create Project> section.

Subject Area

- Definition

  The subject area is a group of highly related data (entities) within the work.

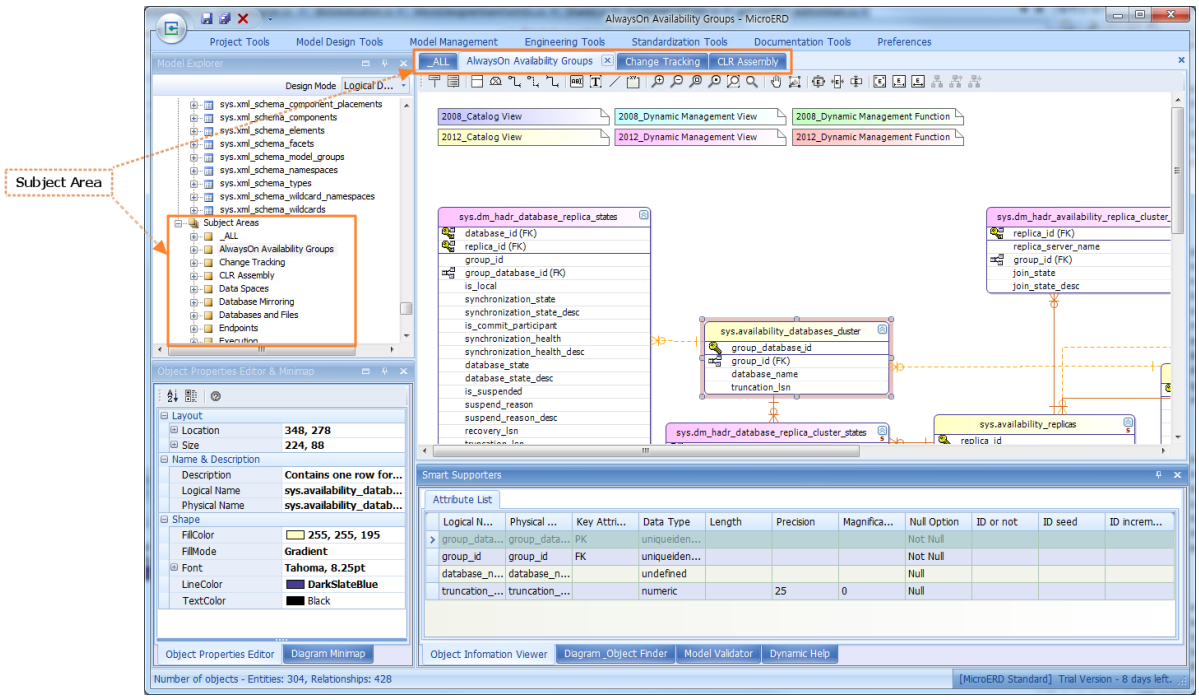
- Description

  This enables you to divide the work into several units and concentrate on designs for your unit when you develop a complicated and large scale system. It also expresses the data in a top-down hierarchical structure to enhance efficiency in work analysis and readability of the designed models.

- Example

  For MD Electronics Mart, which is used as a sample data model in MicroERD™, it can be divided into the "Purchase" Subject Area that is related to the product order, "Logistics" Subject Area that is related to the transportation of the product, and "Sales" Subject Area that is related to the sales at the shop.

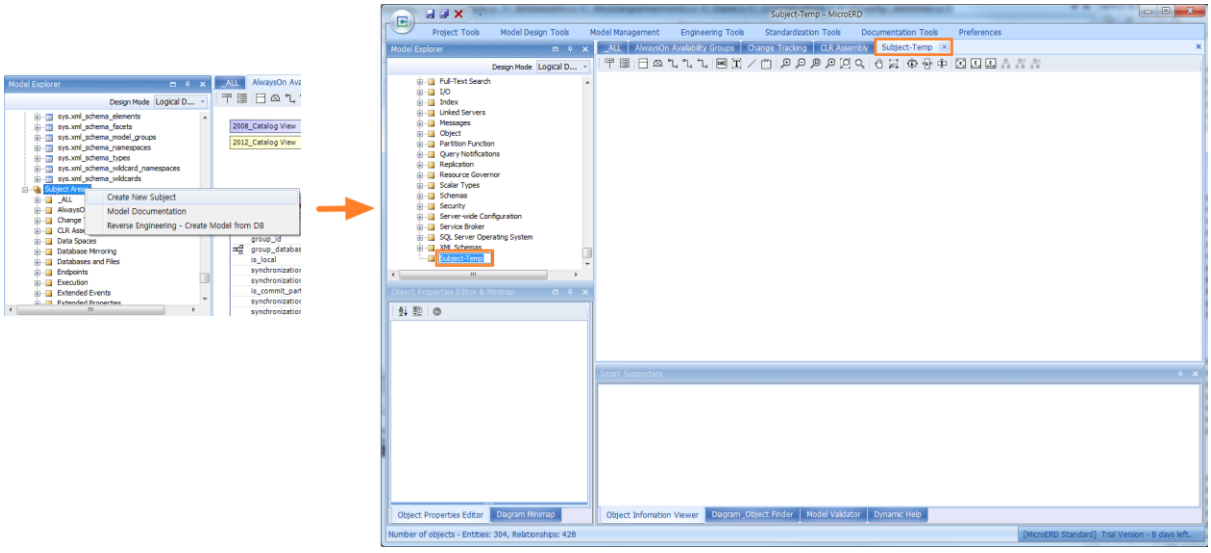
Layout of Subject Areas



You can create a new subject area in the model explorer and view the subject areas you created.

Double click the subject area of the model explorer to add the **selected subject area tab** in the **ER Diagram Area** on the right and you can add, edit or delete entity, relationship, and so forth in the activated **Subject Area**.

Create Subject Area

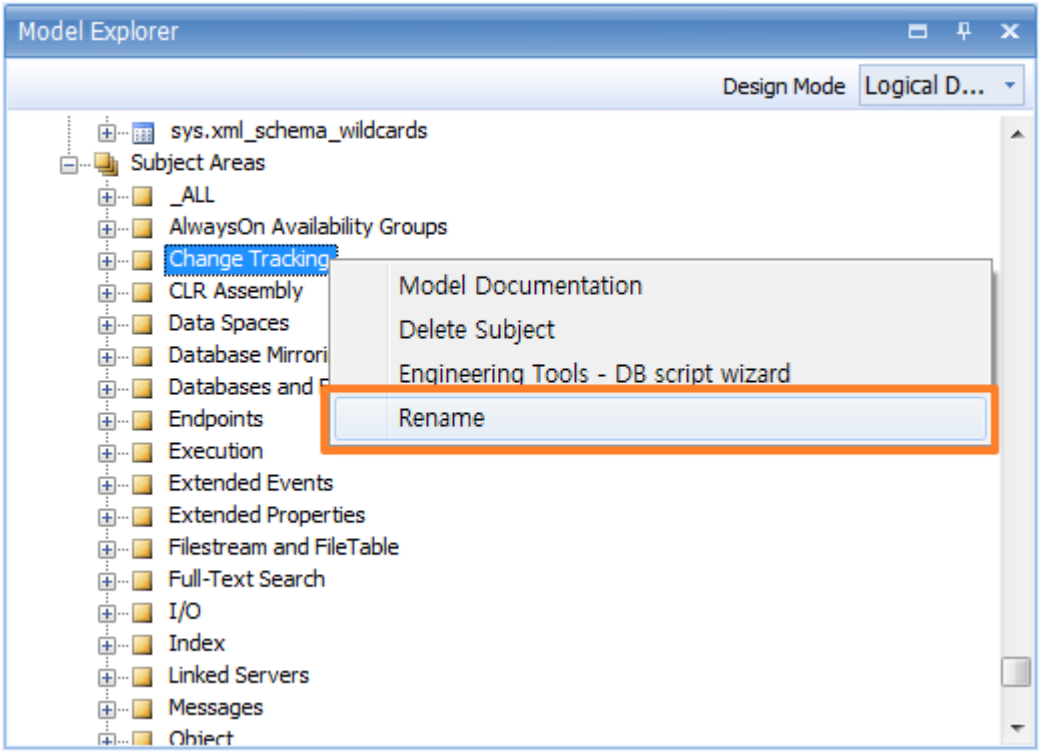


Open the context menu at the top node in the subject area of the model explorer and click [Create New Subject].

A new subject area will be created in the subject area node, and you can enter the name of the subject area.

Double click the subject area to activate the **Subject Area Tab** in the work area of the ER Diagram on the right.

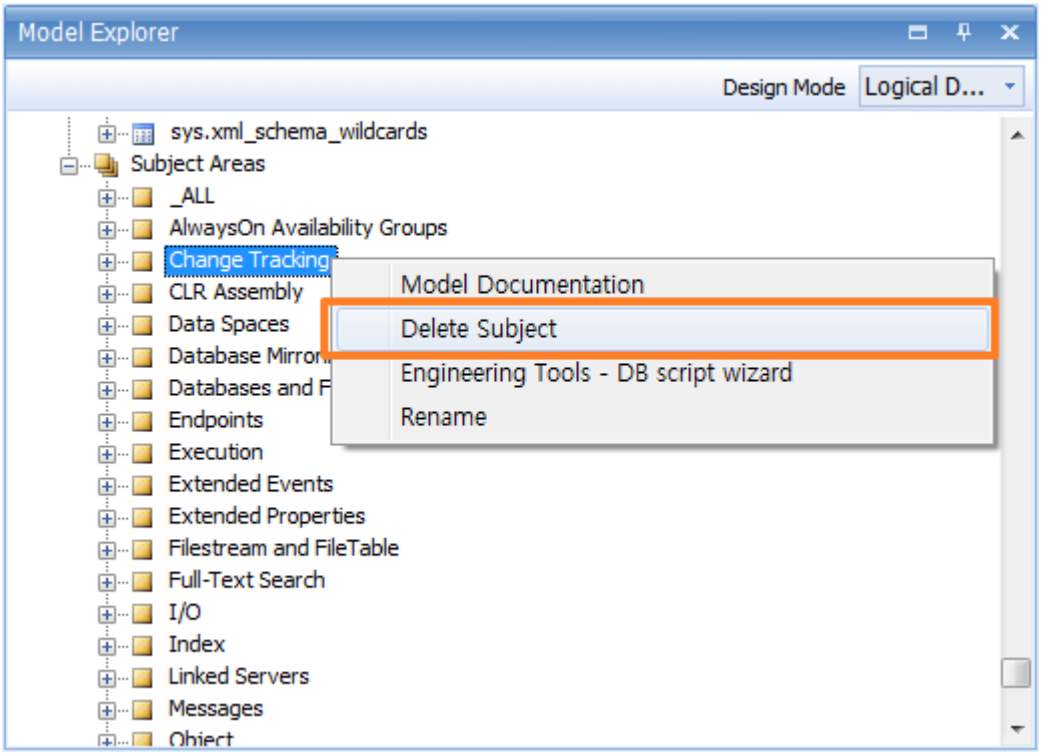
Rename Subject Area



Open up the context menu on the subject area node in the model explorer and edit the name with the [Rename] menu.

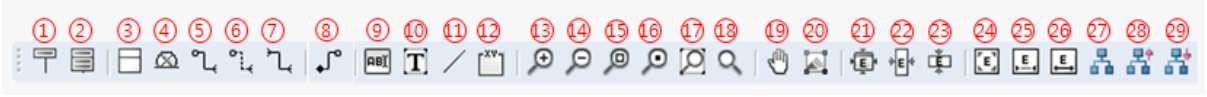
Or double click the name of the subject area or press F2 to rename.

Delete Subject Area



You can open up the context menu on the subject area node of the model explorer and delete the subject area with the [Delete Subject] menu.

ER Diagram Tools



No.	Name of Tool	Description
1	Display entity's name only	Hides attributes and displays entity's name only
2	Display entity's every attribute	Displays entity's name and its attributes
3	Create entity	Creates a new entity
4	Create exclusive sub-type	Creates sub-type relationship
5	Create identity relationship	Creates identity relationship between entities
6	Create non-identity relationship	Creates non-identity relationship between entities
7	Create many-to-many relationship	Creates many-to-many relationship between entities
8	Create custom relationship	Creates customized relationship between entities (Available in

		the physical model only)
9	Create text block	Inserts a simple text
10	Create note	Creates a note for long description
11	Create anchor	Creates a link connecting entity and note
12	Create group box	Creates a group box which binds entities with the same characteristics
13	Zoom up	Increases the size of the active screen
14	Zoom down	Decreases the size of the active screen
15	Diagram-fit-to-screen	Adjusts the screen to display all entities in current subject area in full screen
16	Restore original size	Sets the screen ratio to the default value, 100%
17	Selected-fit-to-screen	Adjusts the size of selected area to the screen size.
18	Magnifier	This is activated when the screen ratio is 100% or less. The part shown through the magnifier is displayed in the original size
19	Scroll diagram with mouse	This is activated when the screen ratio is 100% or greater. Drag the mouse to move the screen.
20	Capture designated area	Captures selected area and saves to the clipboard.
21	Smart resizing	Automatically adjusts the size of the selected entity.
22	Maximize width	Adjusts the width (breadth) of the selected entity to the length of the maximum text among all the attributes
23	Maximize height	Adjusts the height of the selected entity to the size that displays all the attributes
24	Automatic sizing	Automatically adjusts the width and length of the diagram so that all information can be displayed. Click once again to cancel the mode to return to the previous sizes.
25	Display minimum information of entity	Displays the entity's attributes and logical name only. Click once again to cancel this mode.
26	Display maximum information of entity	Displays all the information of entities. Click once again to cancel this mode. ** Information Displayed Logical Model: Icon, logical name, physical name, key information Physical Model: Icon, logical name, physical name, data type, null value, key information
27	Convert sub-type to identity relationship	Converts sub-type relationship of entities to identity relationship
28	Roll up sub-type	This moves all the attributes of the sub-type to the super-type and the sub-type disappears.
29	Roll down sub-type	This moves all the attributes of the super-type to the sub-type and the super-type disappears.

ER Diagram Context Menu

Context Menu	Description
Add entity	Adds the entity existing in another subject area to the corresponding subject area.
Diagram-fit-to-screen	The screen is adjusted to show all entities of the current subject area. This is the same as [Diagram-fit-to-screen].
Show all notes	Shows all notes created
Hide all notes	Hides all notes created
Capture designated area	Captures the selected area and saves to the clipboard.
Pasting	Pastes the copied object to the current subject area. This menu will not appear when there is no copied object
Object finder	Finds an object in the current subject area Searches for entities matching keywords and including the keyword.
Entity display methods	Select the information to be displayed for each entity
Relationship display options	Select the information to be displayed in each relationship
Relocate diagram objects	Relocates the location of all objects within current subject area

Diagram Components

Entity

- Definition

Entity is a person, location, object, and concept to store and manage the information that is useful and essential for the work.

※ The set of objects (entities) is “Entity Type” in relational modeling and we use the term, “Entity”

instead of “Entity Type” for MD product considering general use of terms.

- Description

  The entity is represented by a table in the database and must satisfy the following conditions.

  It must be information to be managed in the work you wish to develop a system for.

  The instance (record) constituting the entity must be identifiable by the unique discriminator.

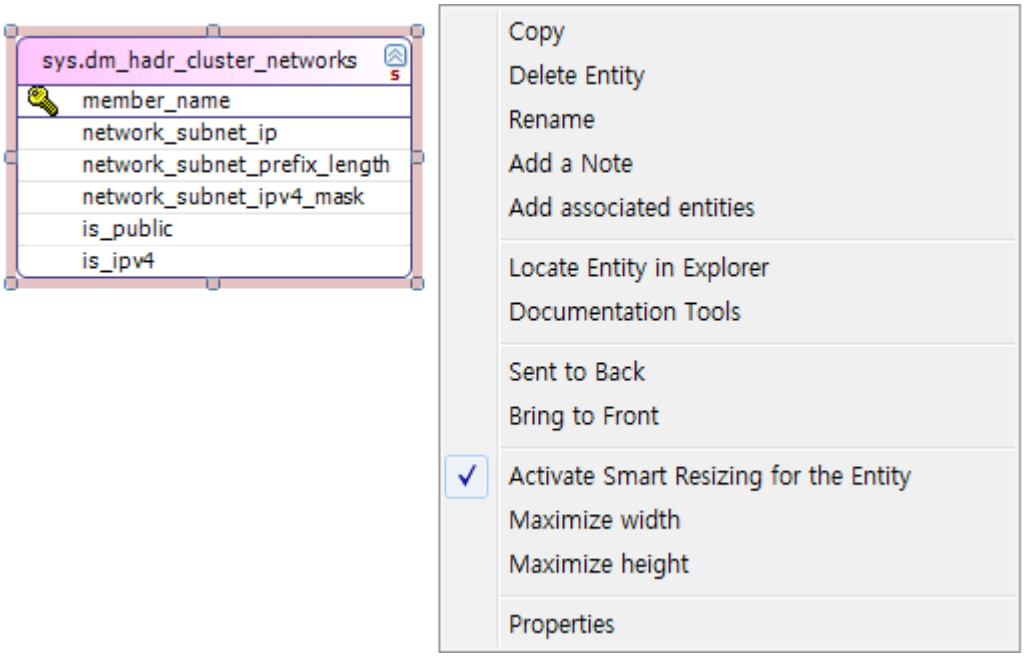
  It must have two or more instances (records).

  It must include attributes that describe the entity.

- Example (Sample Data Model)

  MD Electronics Mart has entities such as Product, Provider, Order, and Stock.

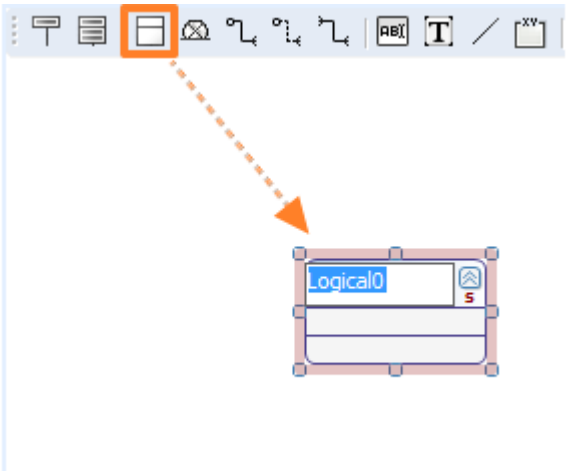
Entity Context Menu



Context Menu	Description
Copy	Copies the selected entity.
Delete entity	Deletes the selected entity.
Rename	Edits the name of the selected entity.
Add note	Adds notes to the selected entity.
Add related entity	Adds all entities related to the selected entity.
Locate entity in explorer	Shows the location of the selected entity in the model explorer.

Documentation	Documents the selected entity.
Send to back	Sends the selected entity to the back when the entity overlaps other objects.
Bring to front	Brings the selected entity to the front when the entity overlaps other objects.
Smart resizing	Automatically adjusts the size of the entity to the length of the entity name and attribute name.
Maximize width	Adjusts the width of the selected entity to the length of the maximum text among all the attributes
Maximize height	Adjusts the height of the selected entity to the size that displays all the attributes
Edit entity property	Shows the window for editing entity property.

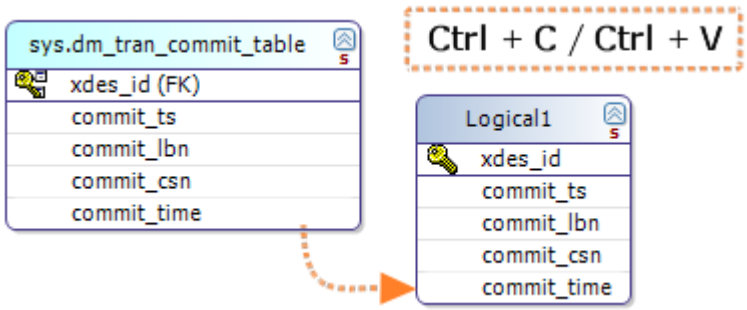
Create Entity



Click [Create Entity] of the **ER Diagram Tool Box**.

Click a spot within the ER Diagram Area to add an entity.

Clone Entity



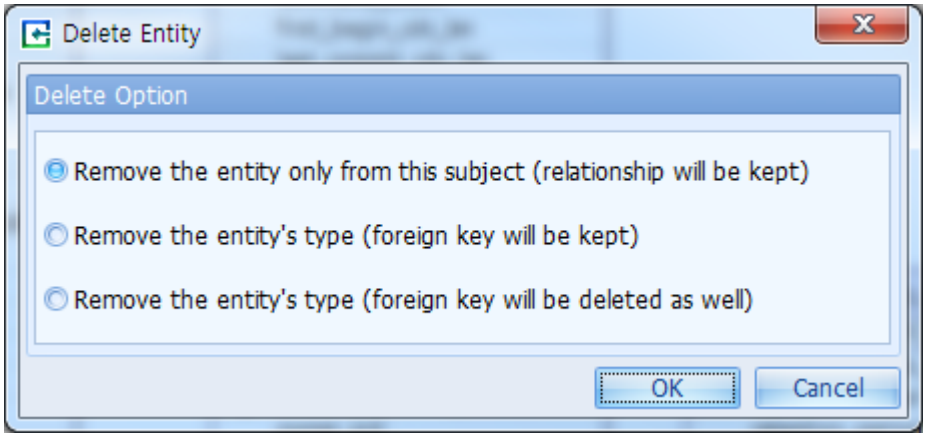
Select the entity you wish to copy, press Ctrl+C to copy, and press Ctrl+V to paste.

The entity's name is copied with the default name, 'Logical X', and its attributes are copied with the same names.

You can also clone the entity using the **Entity Context Menu** and paste the entity through the **ER Diagram Context Menu**.

You can clone the entity using [Project Tools] > [Clone] and paste the entity using [Project Tools] > [Paste].

Delete Entity

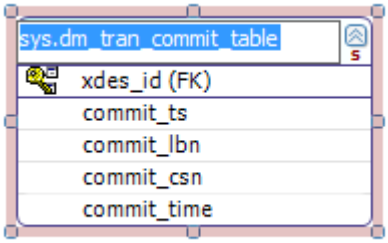

Delete Entity
Delete Option
Remove the entity only from this subject (relationship will be kept)
Remove the entity's type (foreign key will be kept)
Remove the entity's type (foreign key will be deleted as well)
OK
Cancel

Select the entity you wish to delete and press the Delete button.

Also, you can delete the entity with the **Entity Context Menu**.

You can also delete the entity using [Project Tools] > [Delete].

Rename Entity

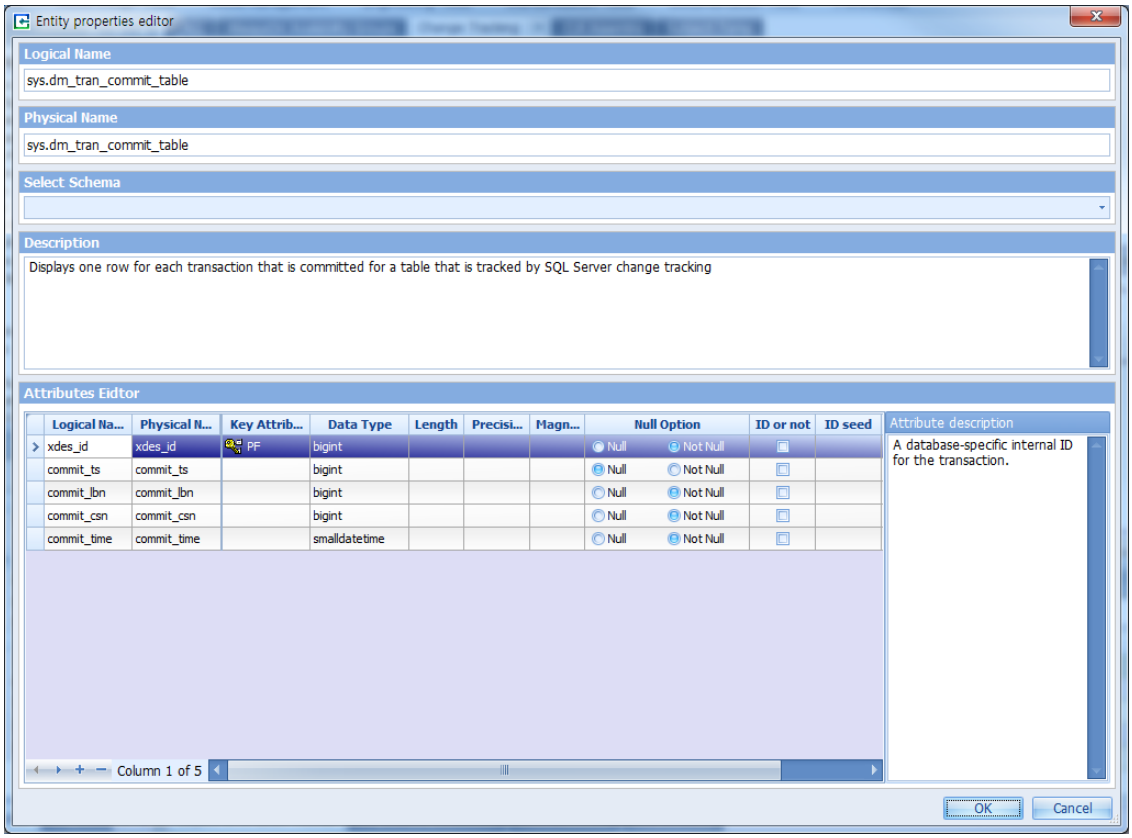


Select the entity you wish to rename, double click the entity's name or press the F2 key to switch to renaming mode. Or select [Rename] in the **Entity Context Menu**.

Enter the new name you wish to change to.

You can rename the entity in the **Edit Entity Property** Window.

Edit Entity Property


Entity properties editor
Logical Name
sys.dm_tran_commit_table
Physical Name
sys.dm_tran_commit_table
Select Schema
Description
Displays one row for each transaction that is committed for a table that is tracked by SQL Server change tracking
Attributes Eidtor
Logical Na... Physical N... Key Attrib... Data Type Length Precisi... Magn... Null Option ID or not ID seed
xdes_id xdes_id PF bigint Null Not Null
commit_ts commit_ts bigint Null Not Null
commit_lbn commit_lbn bigint Null Not Null
commit_csn commit_csn bigint Null Not Null
commit_time commit_time smalldatetime Null Not Null
Attribute description
A database-specific internal ID for the transaction.
Column 1 of 5
OK
Cancel

Select [Edit Entity Property] in the **Entity Context Menu**.

You can enter or edit logical name, physical name, schema, or description.

When editing attributes, you can enter or edit the local name, physical name, key property, data format, length, precision, resolution, null option, ID seed, and ID increment of each attribute.

You can change the order of selected attributes with the Move Attribute buttons (◀/▶).

You can add or delete attributes with the Add / Delete Attribute buttons (+/-).

Attribute

- Definition

  Attribute is the smallest information unit for describing the entity that can no longer be separated.

- Description

  An instance (record) within an entity can have only one value for each attribute. The attributes can be classified into the basic attributes primarily derived in the work analysis stage, the design attributes derived from the design stage, and derived attributes calculated or modified from another attribute.

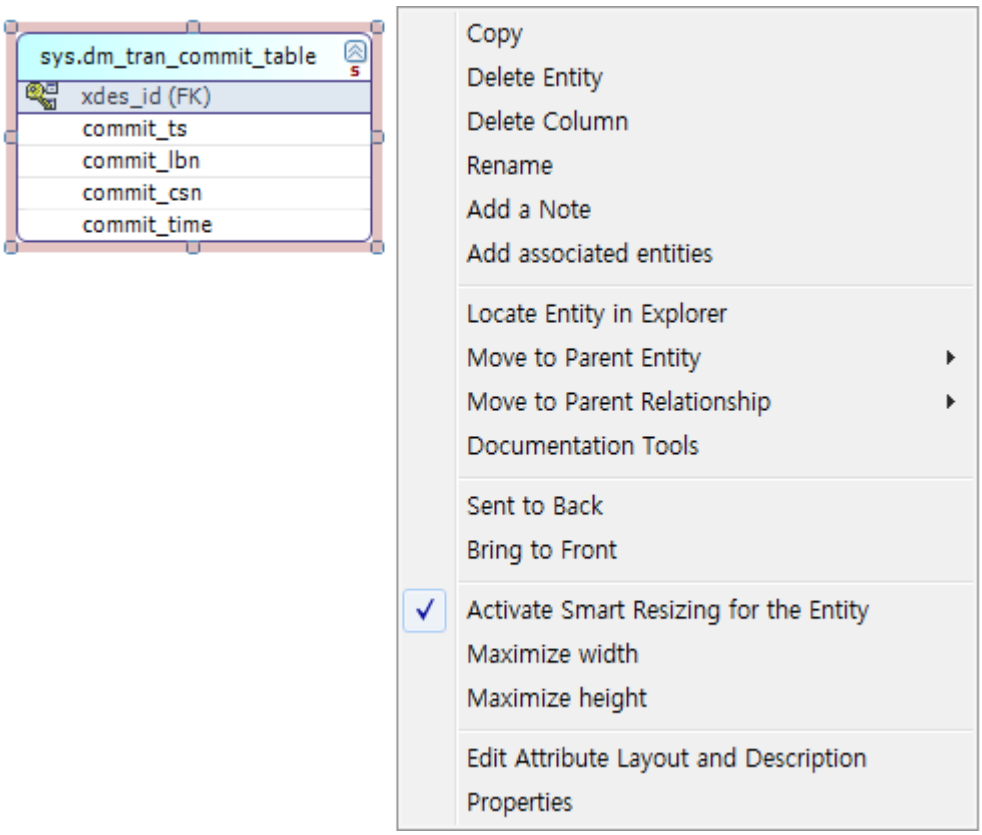
- Example

  Basic Attribute: Product code attribute or product name attribute of product entity

  Design Attribute: Order number attribute of order entity, warehouse/release number attribute of warehouse/release entity

  Derived Attribute: Order amount attribute calculated by the quantity and price of the order entity

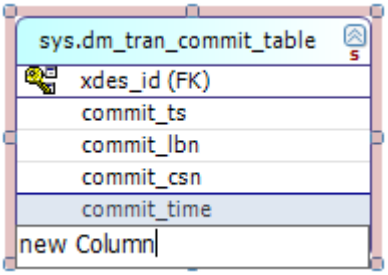
Attribute Context Menu



Context Menu	Description
Copy	Copies the selected entity.
Delete entity	Deletes the selected entity.
Delete attribute	Deletes the selected attribute.
Rename	Edits the selected entity's name.
Add note	Adds note to the selected entity.
Add related entity	Adds all entities related to the selected entity.
Locate entity in explorer	Shows the location of the selected entity in the model explorer.
Move to parent entity	Finds and displays the parent entity of foreign key attribute.
Move to parent relationship	Finds and displays the parent relationship of foreign key attribute.
Move to child entity	Finds and displays the child entity of the basic key attribute
Move to child relationship	Finds and displays the child relationship of the basic key attribute.
Documentation	Documents the selected entity
Send to back	Sends the selected entity to the back when the entity overlaps with other objects.
Bring to front	Brings the selected entity to the front when the entity overlaps with other objects.
Smart resizing	Automatically adjusts the size of the entity to the length of the entity name and attribute name.
Maximize width	Adjusts the width (breadth) of the selected entity to the length of the maximum text among all the attribute

Maximize height	Adjusts the height of the selected entity to the size that displays all the attributes
Edit attribute format and description	Edits the format and description of the selected attribute.
Edit entity property	Shows the window for editing entity property.

Add Attribute



Select the entity to add an attribute, double click the last attribute or select the last attribute and press the F2 key.

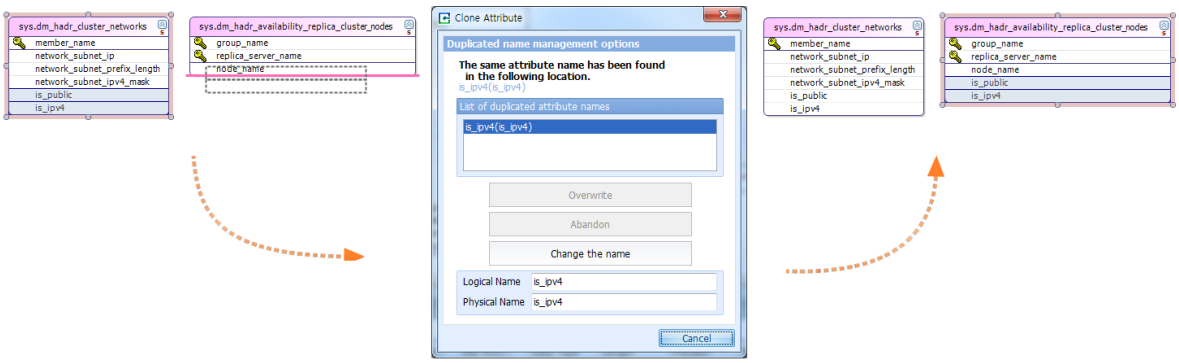
When the attribute changes to edit mode, press the Enter key to create a new text box.

Enter the attribute name to add and press the Enter key to add the attribute to the entity.

Press the ESC key or click any area outside the entity to end the edit mode.

You can also add attributes using **Entity Context Menu >Edit Entity Property**.

Copy Attribute



Select the attribute you wish to copy. Use the Ctrl or Shift key for multiple selection.

While holding the Ctrl key, drag and drop the attribute to the area you wish to copy the attribute to.

If there is an attribute under the same name, Corporate Registration Number in this case, you will be notified of the information of the overlapped column.

Item	Description
Overwrite the existing column with the copied attribute	The target attribute will be updated with the attribute to be copied.
Abandon	Cancels copy.
Change name and copy	Enter logical name / physical name in the window beneath to add the attribute as a new attribute.

Move Attribute / Change Order

You can select an attribute and drag & drop it to move or to change the order.

Select the attribute to be moved. Use the Ctrl or Shift key for multiple selection.

Drag and drop the selection to the target point.

You can also change the order of attributes through the **Entity's Context Menu**>**Edit Entity Property** Window.

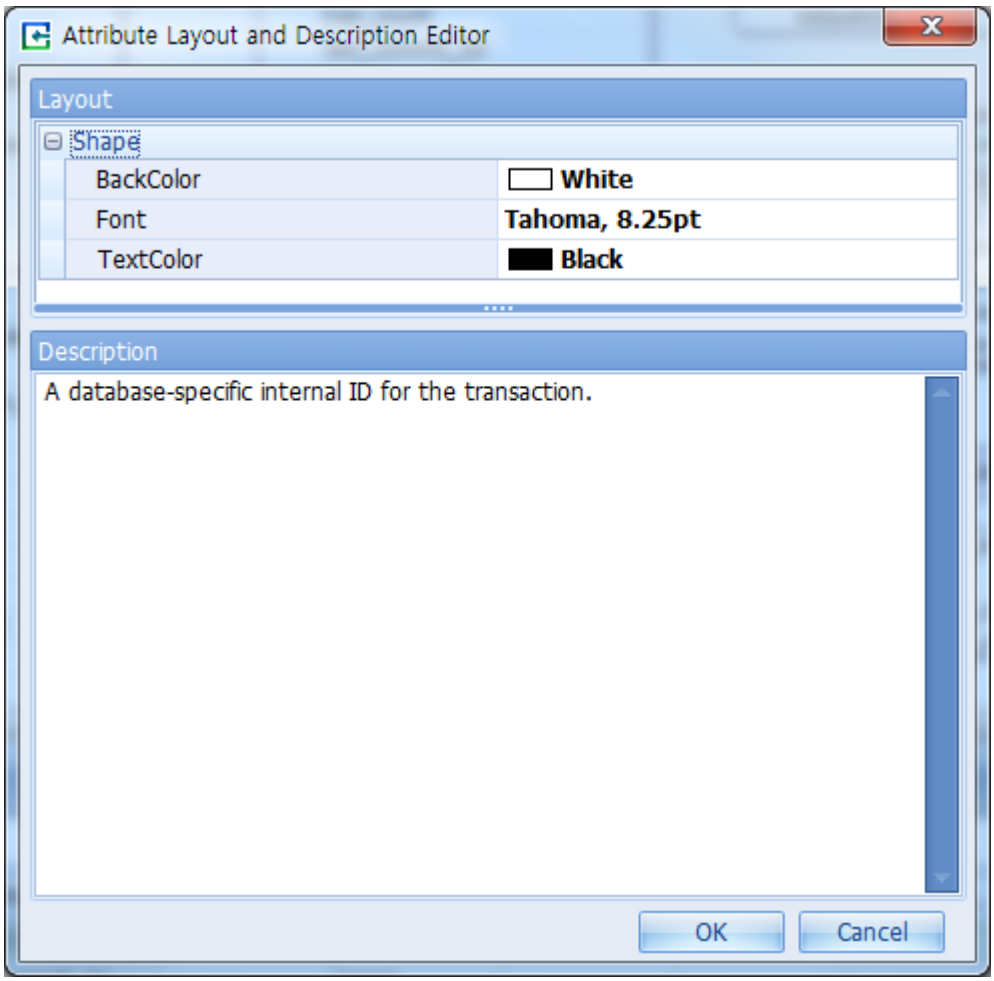
Delete Attribute

Select the attribute to be deleted.

You can delete the attribute by pressing the Delete button or [Delete attribute] of the **Attribute's Context Menu**.

The parent key or foreign key used in the relationship can be deleted only after deleting the relationship between corresponding entities.

Edit Attribute Format and Description



Select an attribute to be edited and select **Attribute's Context Menu**> [Edit attribute format and description] menu.

You can edit background color, font and font color, and add a description about the attribute.

Relationship

- Definition

  Relationship represents the relationship between entities and is the format, behavior, or event between two entities.

- Description

  Type of Relationship

Identity Relationship/ Non-identity Relationship: Identity relationship is the relationship where the primary identifier of the parent entity is inherited as a primary identifier of the child entity and non-identity relationship is where it is inherited as a general attribute of the child entity.

Self-referential Relationship: This is the relationship between instances within the same entity, and it represents the hierarchical structure.

Super-type and sub-type Relationship: When there are common attributes for all instances within an entity while each instance group has unique attributes, they can exist as a super-type entity that has common attributes and separate sub-type entities.

Cardinality of Relationship

Cardinality represents the number of participants in the relationship between two entities. Cardinality is generally expressed as 1:M, 1:1, and M:N.

1:M (One To Many) Relationship: An instance where one of two entities participating in a relationship (parent entity) is related to one or more instances of the other entity (child entity), and in the opposite case, an instance where the child entity is related to only one instance of the parent entity. This is the most common relationship in modeling.

1:1 (One To One) Relationship: An instance where one of two entities participating in a relationship is related to only one instance of the other entity.

M:N (Many To Many) Relationship: An instance where one entity is related to many instances of other entities in both directions between two entities participating in a relationship.

M:N relationship between two entities is deployed to two 1:M stages using an additional third entity in the detailed design.

- Example (sample data model)

Identity Relationship: "Provider" and "Provider's Products"

The primary identifier of the provider's products is the "Provider Code + Product Code". And this is the identity relationship because its primary identifier, Provider Code is also the primary identifier of 'Provider', which is the parent entity of the relationship.

Non-identity Relationship: "Provider" and "Order"

The primary identifier of "Order" is "Order Number". And this is the non-identity relationship because its general attribute, "Provider Code" is the primary identifier of the "Provider", which is the parent entity of the relationship.

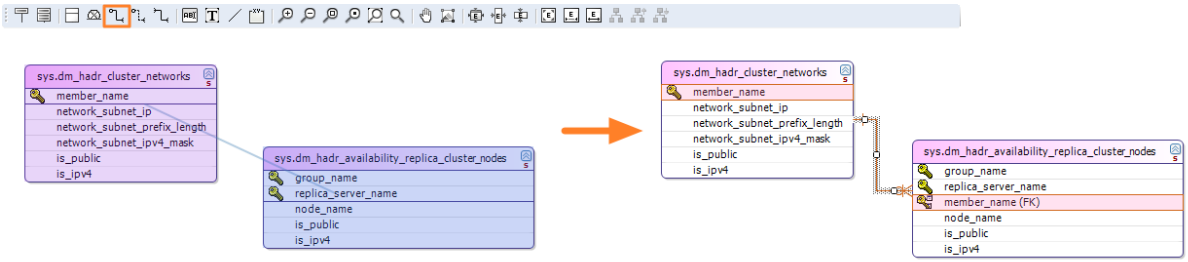
Self-referential Relationship: "Product Classification"

The "Upper level product classification code" of an instance refers to the "Product Classification Code" of another instance within the same entity. This is self-referential relationship.

Super-type Sub-type Relationship: Super-type–"Center", Sub-type –"Warehouse" and "Shop"

"Center" is divided into "Warehouse" and "Shop". That means "Warehouse" and "Shop" are sub-types of "Center". And "Center" has common attributes such as Center Name, Address and has a relationship with "Inventory" entity. "Warehouse" and "Shop" have individual attributes and "Warehouse" has a relationship with the "Warehouse/Release" entity.

Create Identity Relationship



Click [Create Identity Relationship] **in ER Diagram Tool Box**.

Click a parent entity to create an identity relationship and then click a child entity.

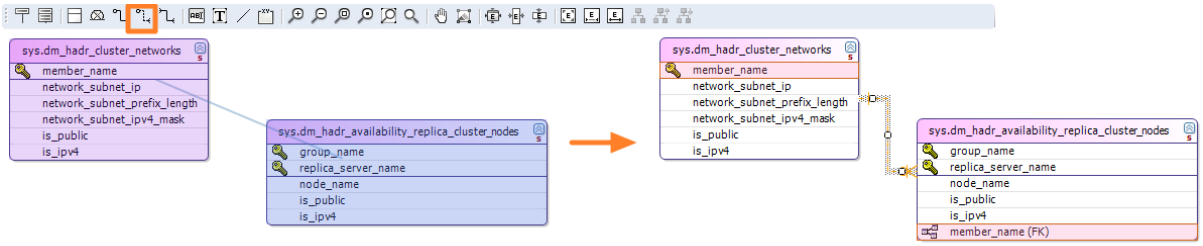
If the child entity does not have any attribute, the relationship will be created immediately and the parent's attribute will be added.

When the child entity has attributes, select the Move Attribute Option in the **Identity Relationship Creation Options** window.

Item	Description
Overwrite the child entity's collided attribute with a FK.	The attribute of the duplicated child entity is updated with the logical and physical names entered. No attribute is newly added to

	the child entity.
Modify the child entity's FK name.	The existing attribute of the duplicated child entity will remain the same, and the new attribute will be added with the logical and physical names entered.
Modify the child entity's collided name and create a FK.	The existing attribute of the duplicated child entity will be replaced with the logical and physical names entered, and the new attribute will be added under the duplicated name.

Create Non-identity Relationship



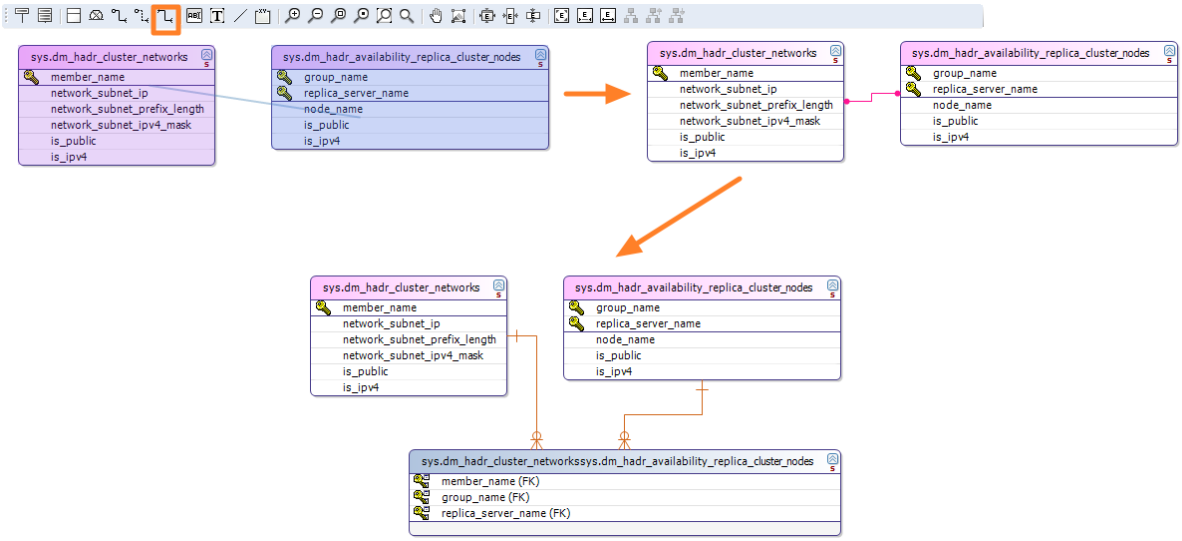
Click [Create non-identity relationship] of **ER Diagram Tool Box**.

Click the parent entity to create non-identity relationship and then click the child entity.

The relationship will be added immediately if the child entity does not have any attribute.

If the child entity has attributes, you can select Move Attribute Option through the **Identity Relationship Options** window.

Create Many-to-many Relationship



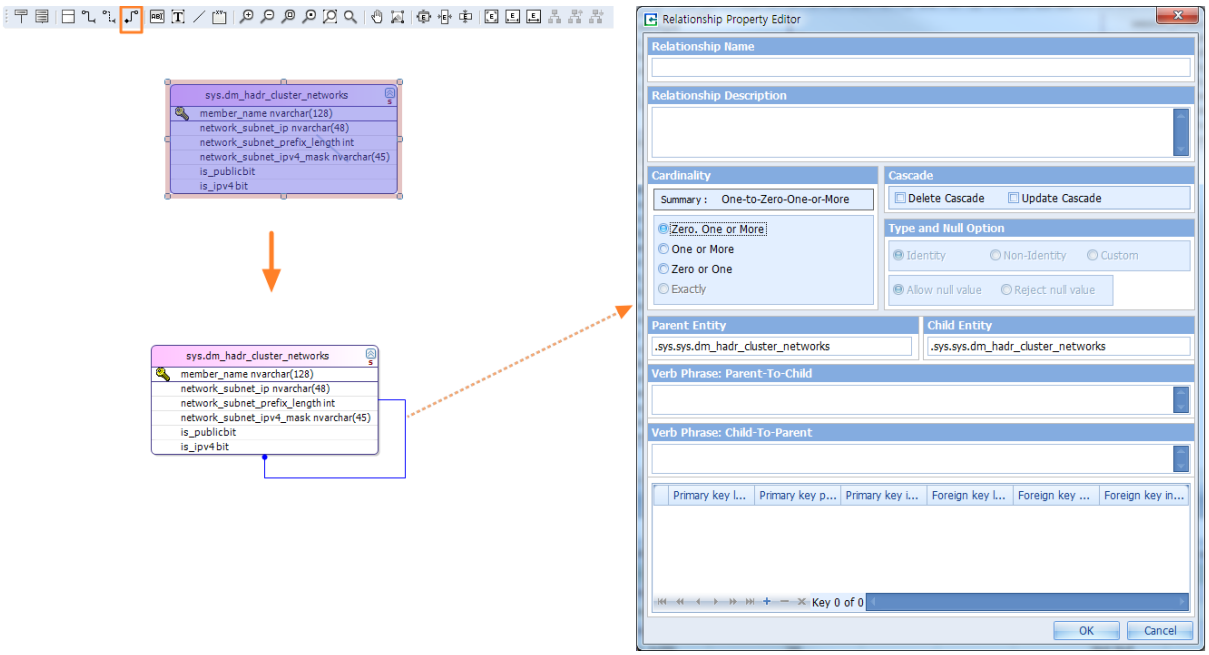
Many-to-many relationship only appears in a logical model.

Click [Create many-to-many relationship] in the **ER Diagram Tool Box**.

Connect the entities to create a many-to-many relationship. This will set many-to-many relationships in the logical model.

In a physical model, it is general to create separate tables with 1:M relationships and delete the many-to-many relationship. This can be done by creating separate tables using [Convert many-to-many relationship to identity relationship] in the **Relationship Context Menu**.

Create Custom Relationship



Custom relationship only appears in a physical model. You can create a variety of relationships by creating a custom relationship.

Click [Create Custom Relationship] of the **ER Diagram Tool Box** and click two entities in successive order to create a relationship. Double click the same entity to create a self-referential relationship.

The first entity becomes the parent entity and the second entity becomes the child entity.

You can also edit cardinality, cascade, and null permission through the Relationship Properties Editor window.

Self-referential Relationship

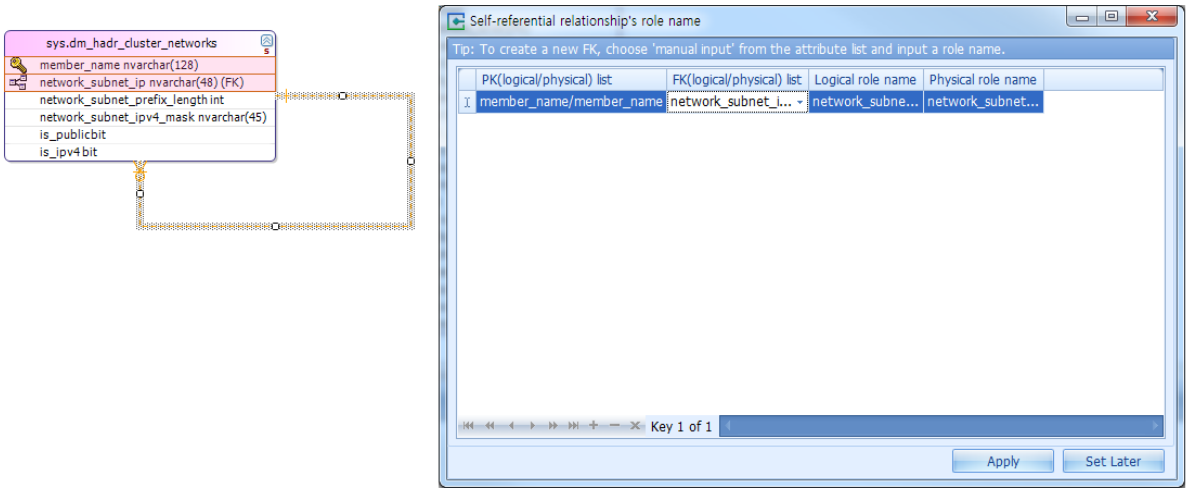
Self-referential relationship is established as a non-identity relationship.

Click [Create Non-identity Relationship] in the **ER Diagram Tool Box** and click the entity to set the self-referential relationship to and click on that entity once again.

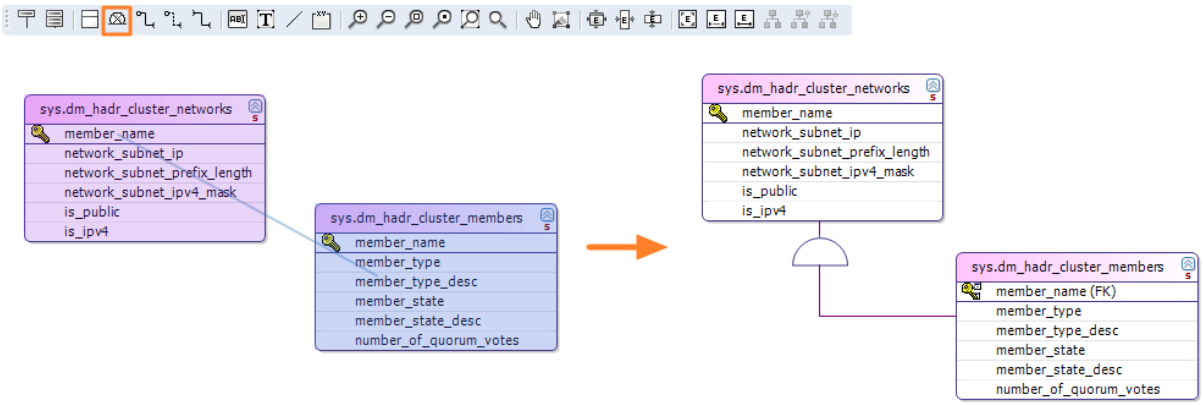
The **Self-referential Relationship's Role Name Setting** window will appear and if there are attributes to be set as FK, the attributes will appear in the list of foreign keys.

If there is no attribute, you can select Manual Input and enter the role's logical name and physical name directly.

When you are setting up the self-referential relationship as an identity relationship, a message that recommends you to create it as a non-identity relationship will appear.

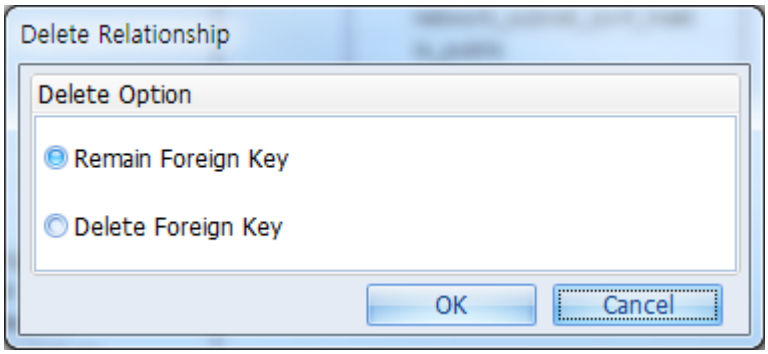


Create Sub-type Relationship



You can create a sub-type relationship using [Exclusive sub-type] of the **ER Diagram Tool Box**.

Delete relationship

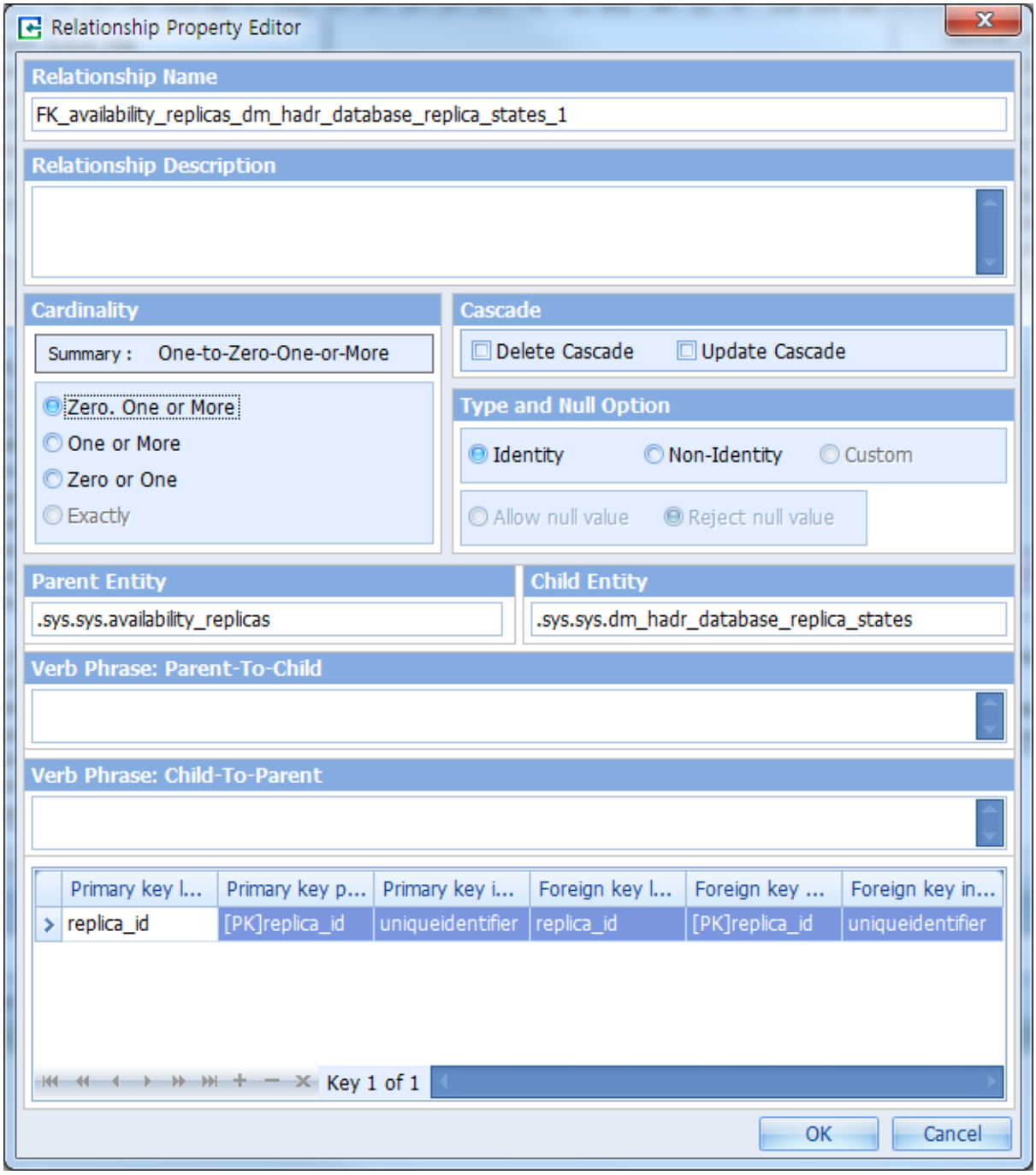


Select the relationship to be deleted and press the Delete key, then the Delete Relationship window will appear.

Select a Delete Option and click the OK button to delete the relationship.

You can also delete a relationship using [Delete relationship] in the context menu.

Relationship Properties Editor

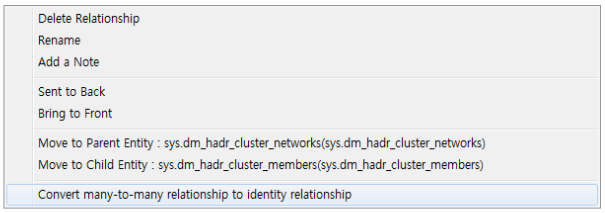


You can edit the relationship's properties by double clicking on the relationship or [Relationship Properties Editor] in the Relationship Context Menu.

Editable items are cardinality, cascade option, identity relationship, null permission, and verb phrases between

the parent and the child.

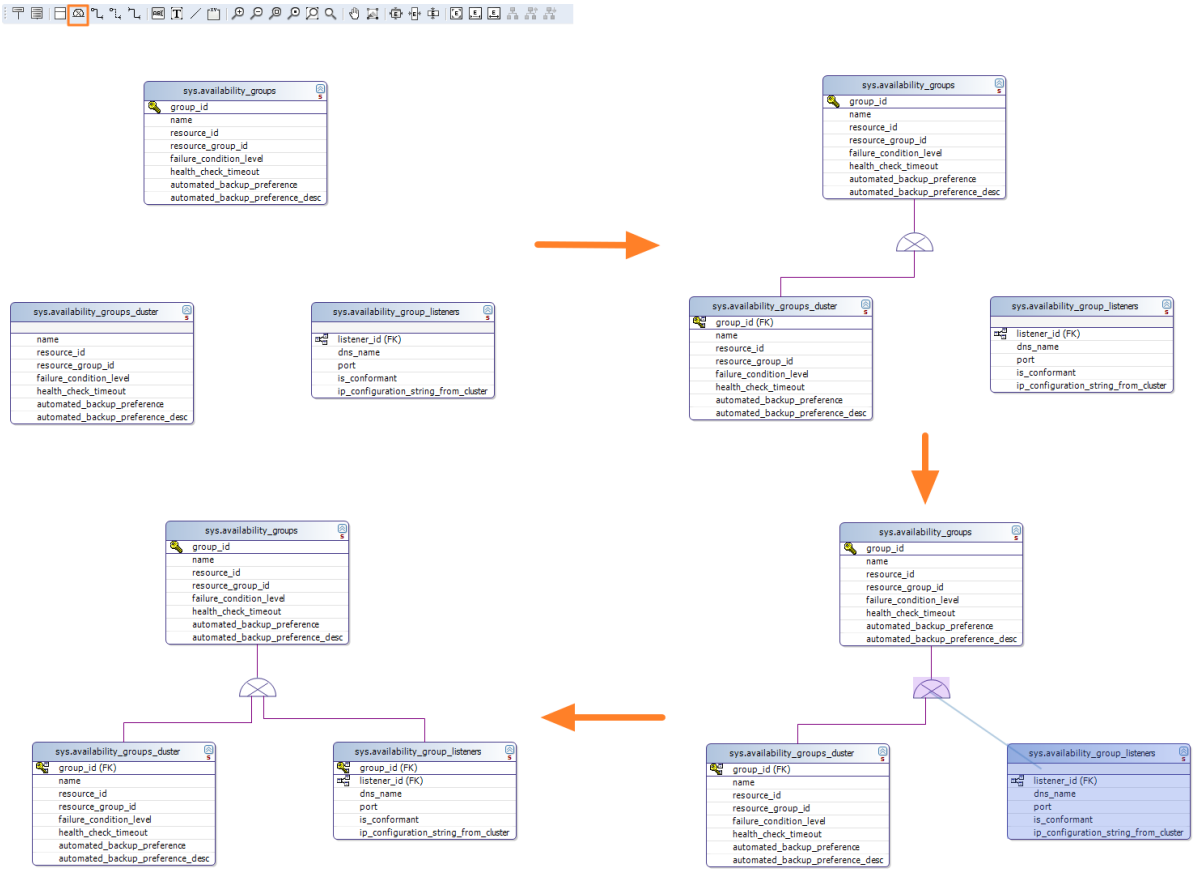
Relationship Context Menu



Context Menu	**Description**
Delete relationship	Deletes the selected relationship.
Add note	Add a note to relationship.
Move to parent entity	Displays the parent entity of the relationship.
Move to child entity	Displays the child entity of the relationship.
Edit relationship properties	Change relationship properties through the **Edit Relationship Property** Window.
Convert identity relationship to many-to-many relationship	Converts many-to-many relationship to identity relationship.
Edit sub-category property	Change sub-category properties of sub-type object.

Sub-type Relationship

Create Sub-type Relationship

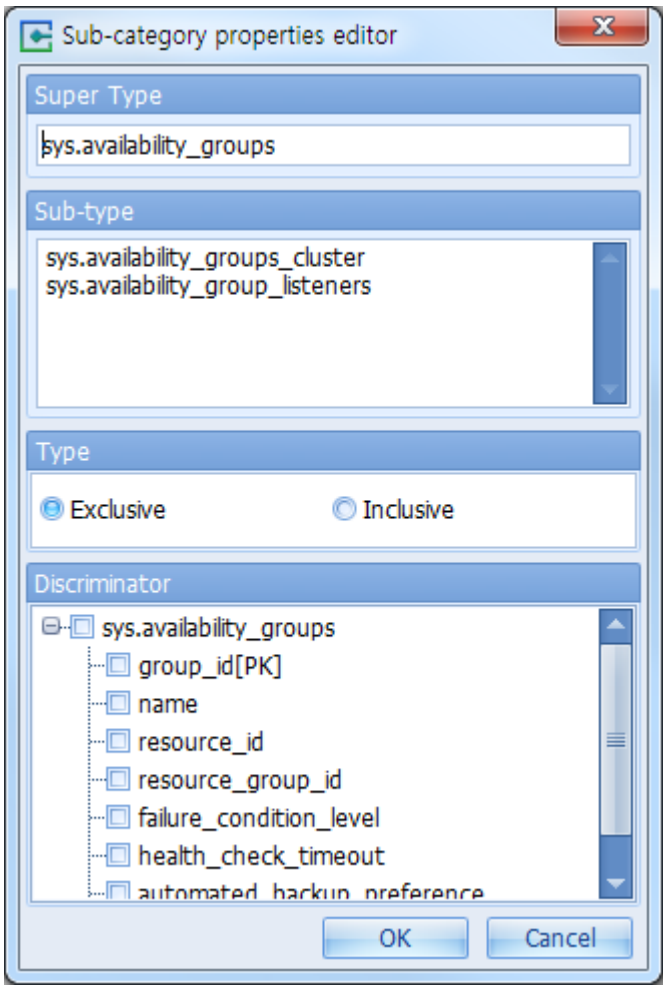


Click [Exclusive sub-type] in the **ER Diagram Tool Box** and select the super-type entity and the sub-type entity in successive order to set the first sub-type relationship.

Then, click [Exclusive sub-type] in the **ER Diagram Tool Box,** select and then select the second sub-type entity to create a super/sub-type with two sub-types.

Here, the primary key of the super-type is inherited as the primary key of the sub-type.

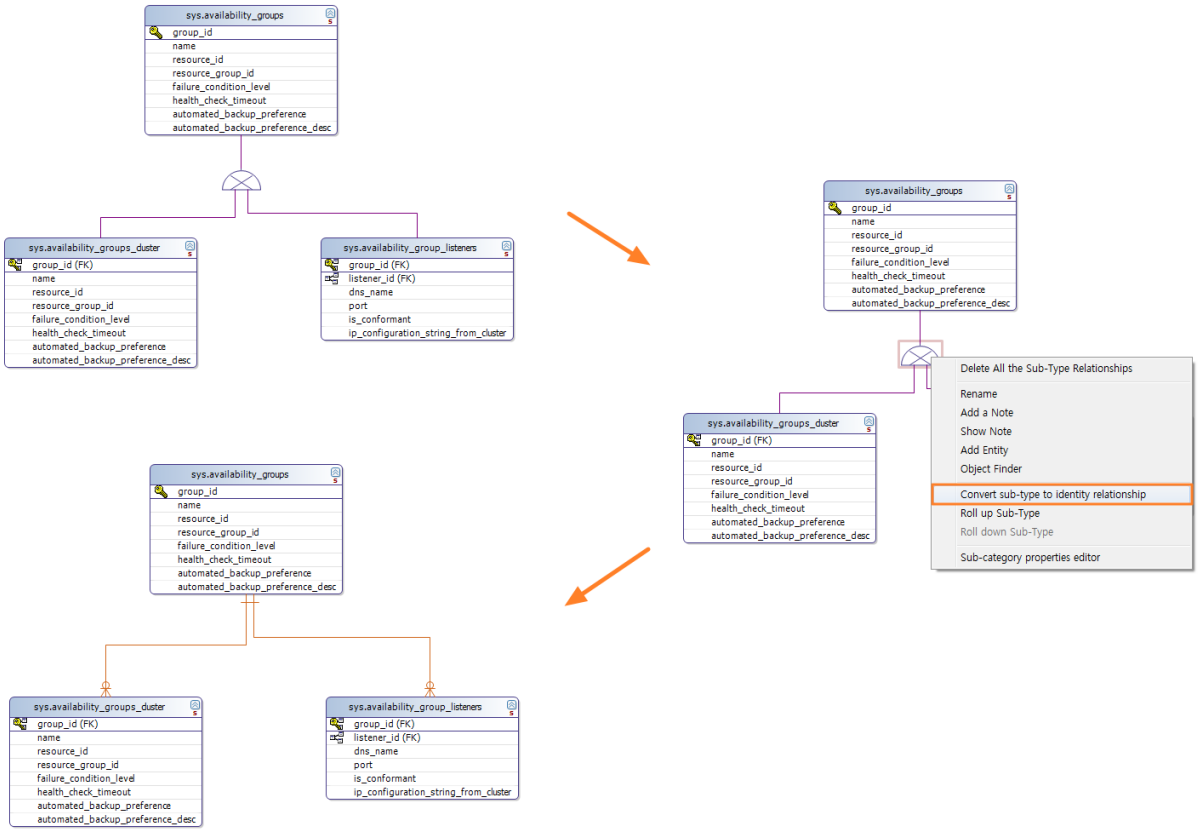
Edit Sub-type Property



Select a sub-type relationship and select [Edit sub-category property] in the **Relationship Context Menu**.

You can select Exclusive or Inclusive type, and the discriminators.

Convert Sub-type to Identity Relationship



Select a sub-type relationship and click [Convert sub-type to identity relationship] in the context menu to convert super/sub-type relationship to identity the relationship.

Roll up sub-type

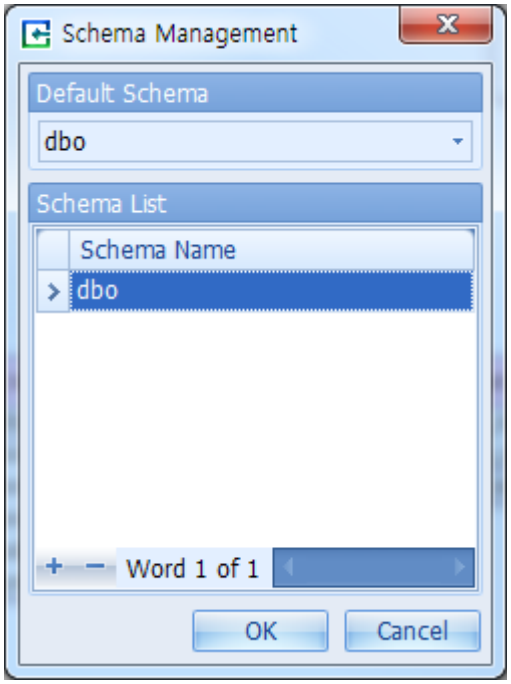
When you select a sub-type relationship and click the [Roll up sub-type] menu, all properties of the sub-type will be included in the attributes of super-type entity and the sub-type entity will disappear.

Roll down sub-type

When you select a sub-type relationship and click the [Roll down sub-type] menu, all the attributes of the super-type will be included in the sub-type entities, and the super-type entity will disappear.

Model Management

Schema Management

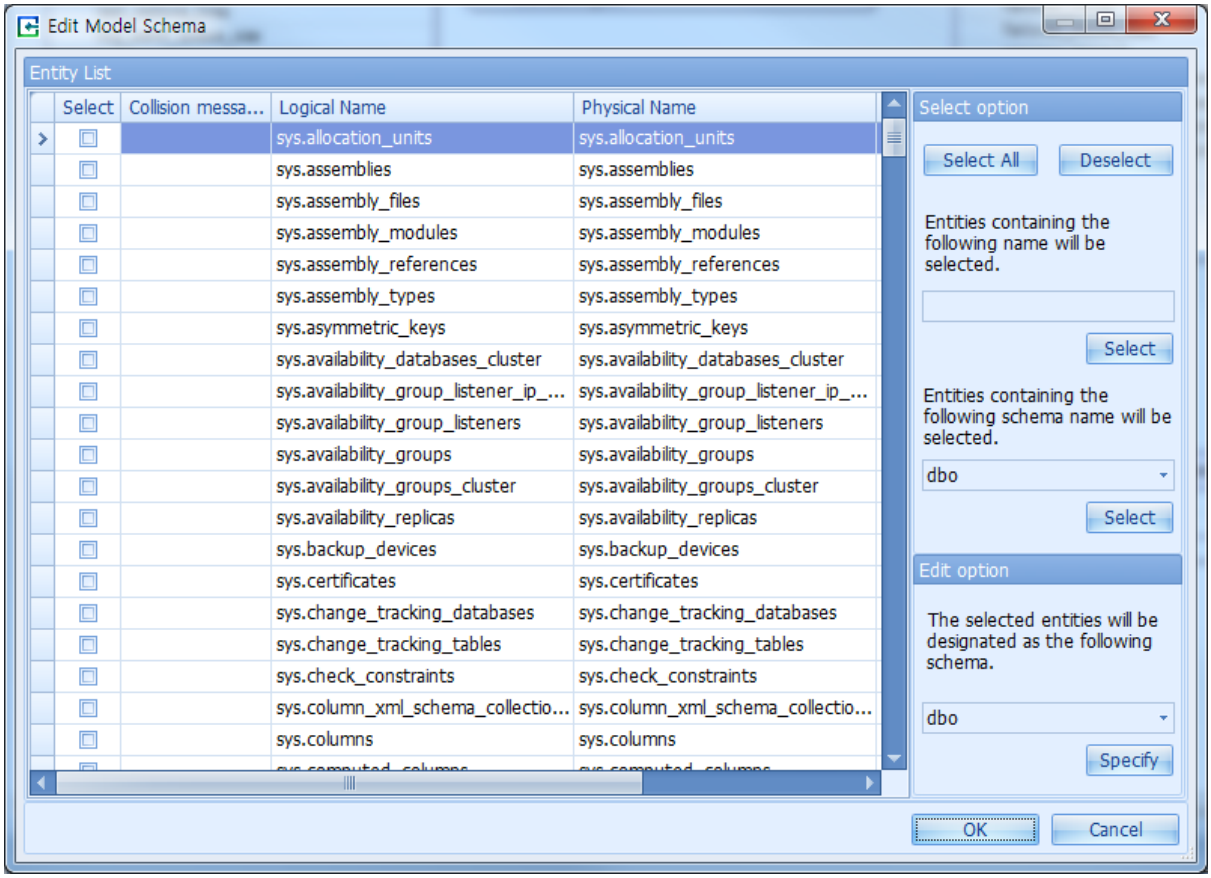


This function manages schema used in the current project.

The default schema is initially set to dbo and can be changed by the modeler.

You can add or delete a schema, however, the default schema, dbo, and the schema that is currently used in the model cannot be deleted.

Change Model Schema

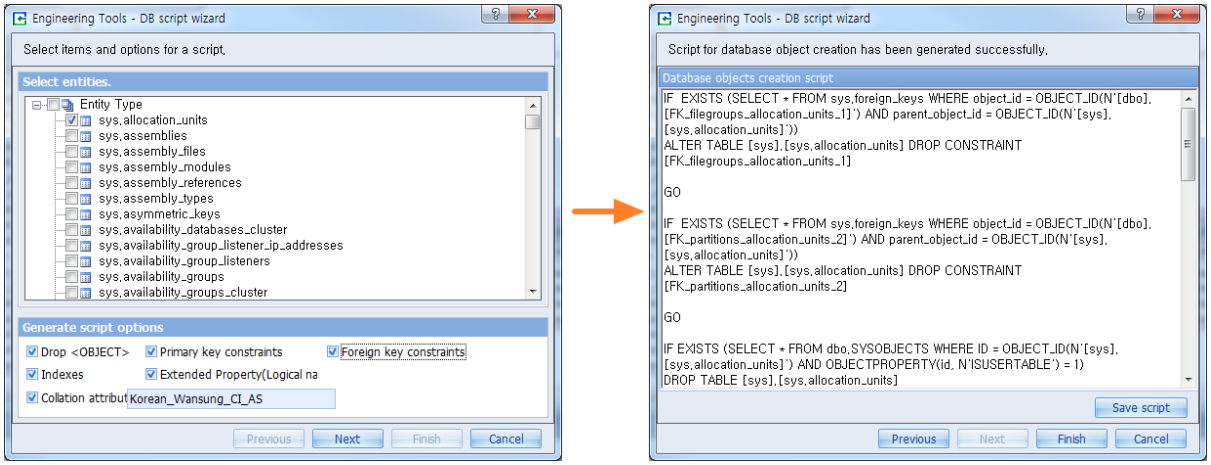


This helps the change of the schema for all entities within the current project.

You can select all to apply changes all at once, or quickly change the schema by searching and selecting specific entities.

Engineering Function

Forward Engineering



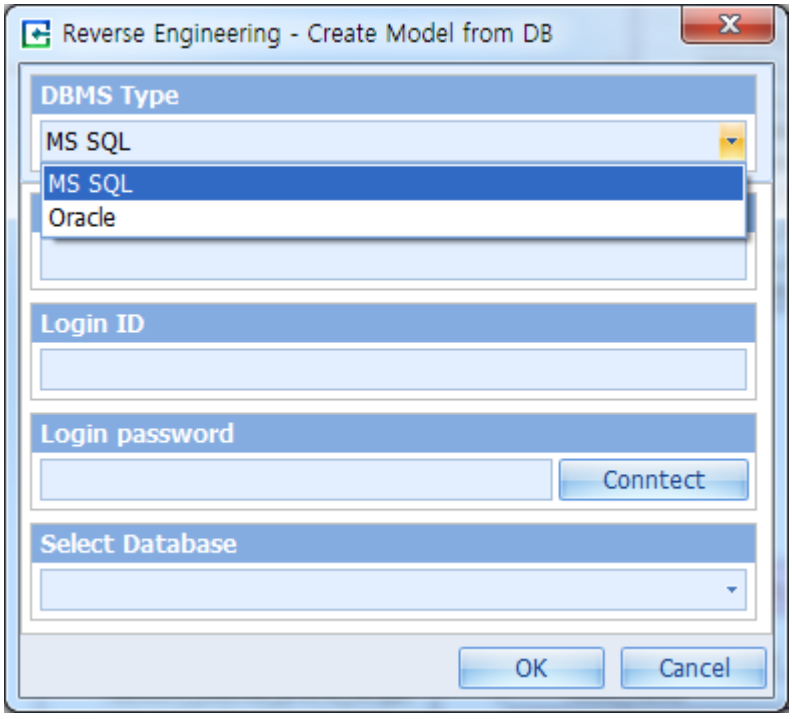
Select the subject area or entity to create the script from the model explorer, and click [Engineering Function] > [Engineering Function] on the top.

Engineering Function –DB Script Wizard Window will appear and you can select the entity and target DBMS, as well as script creation options.

Click the Next button to create the script and you can create an actual database object using this script.

You can also use the engineering function on the entity node of the model explorer and the context menu on the subject area node.

Reverse Engineering



Click [Reverse Engineering] > [Reverse Engineering] on the top.

Reverse Engineering –Create Model from DB Window will appear. Enter DBMS server name, user ID, and password and click the Connect button.

When you receive a message that the connection is successfully made, you can choose the database.

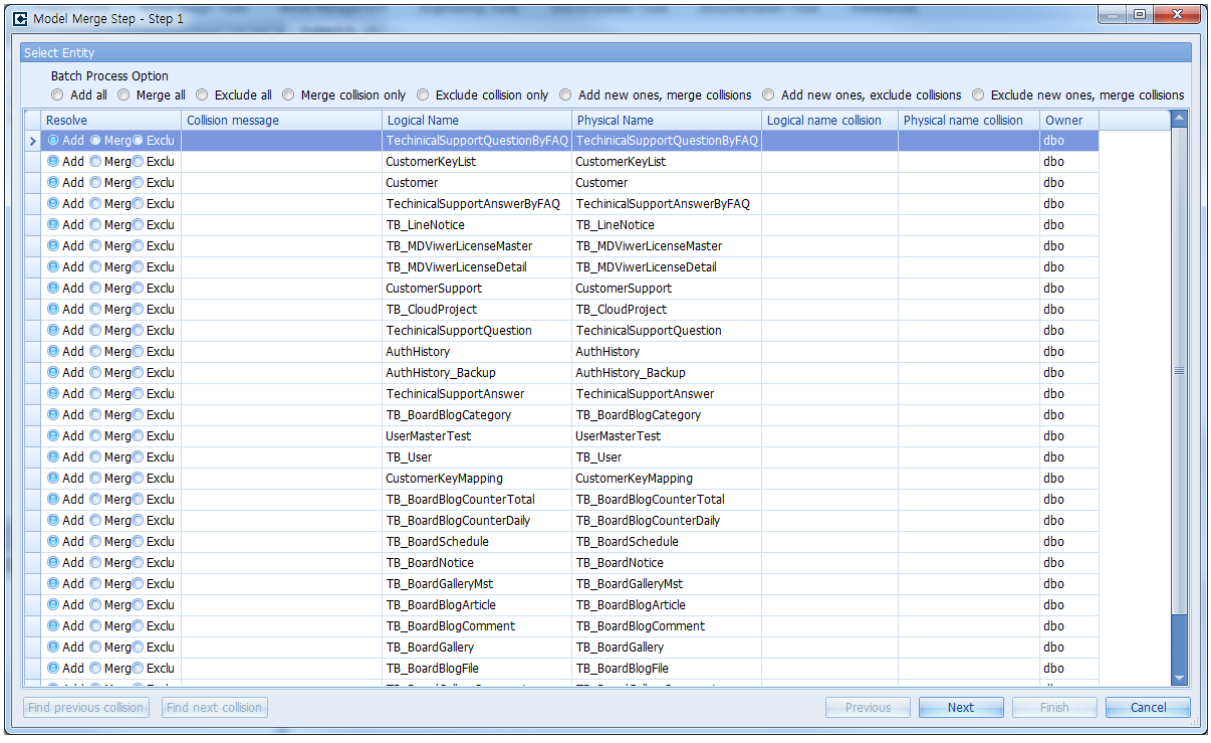
When you select the database and click the OK button, the Model Merge window will appear.

Model Merge

Model Merge appears when you use the reverse engineering function.

Model Merge takes place in two stages; one in the entity level and the other in the attribute level.

Stage 1 of Model Merge



The first stage of Model Merge is confirmation of the merge on the entity level.

If the entity already exists, a collision message will appear, and the default option is Merge.

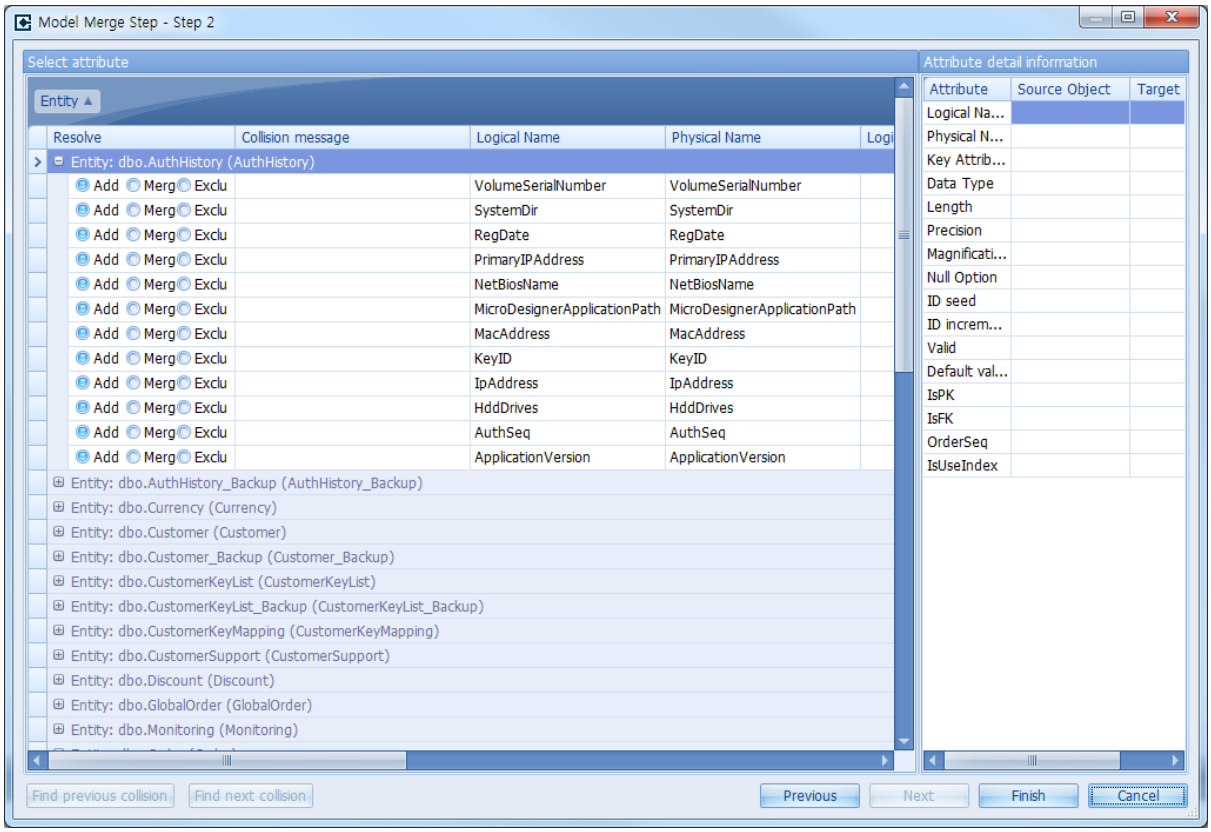
If the model does not exist, the default option will be set to Add.

For the object that indicates Collision, you can check which object has been collided based on its logical name and physical name.

If you choose Batch Processing option, you can select Add/Merge/Exclude regardless of the

default option.

Stage 2 of Model Merge



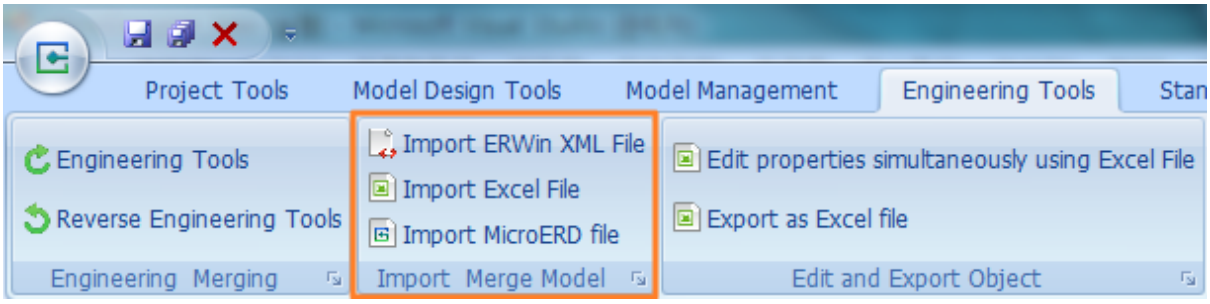
The second stage of Model Merge manages the merging on the attribute level.

When attributes are collided, a collision message will appear and you can choose to merge or exclude the attribute.

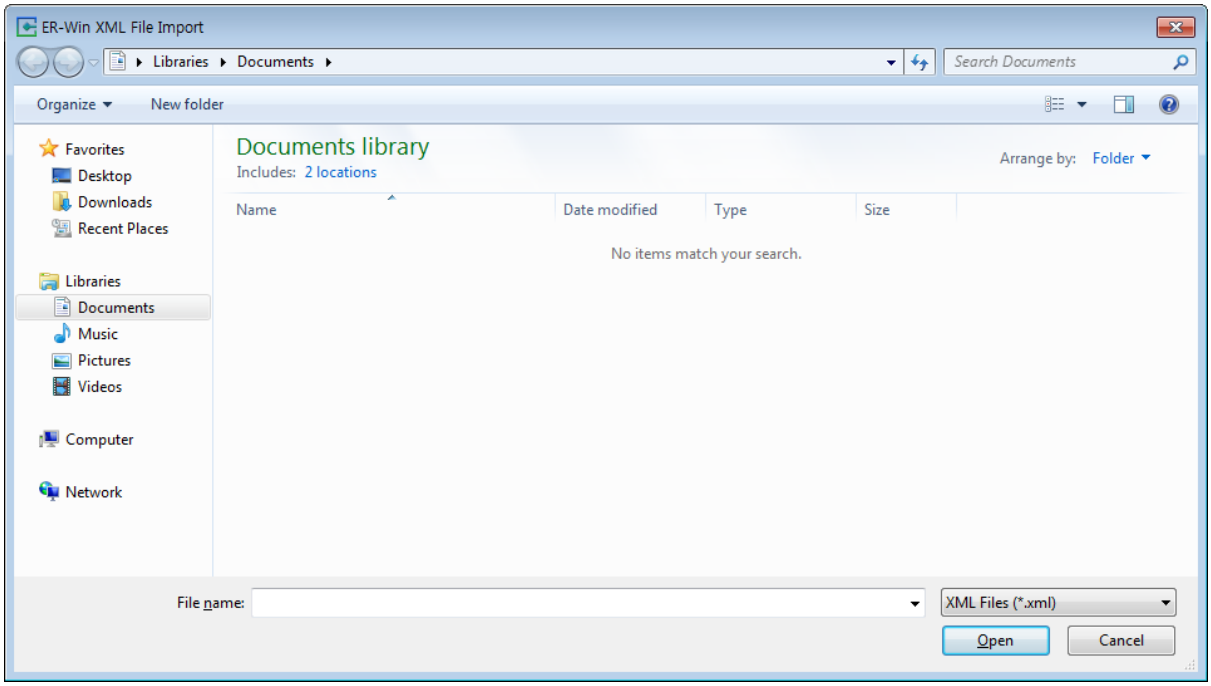
When you select each attribute, you can check the default object and target object through the detailed attribute information.

An ER diagram will be created when you click the Finish button.

Import from File



Import from ERWin XML File

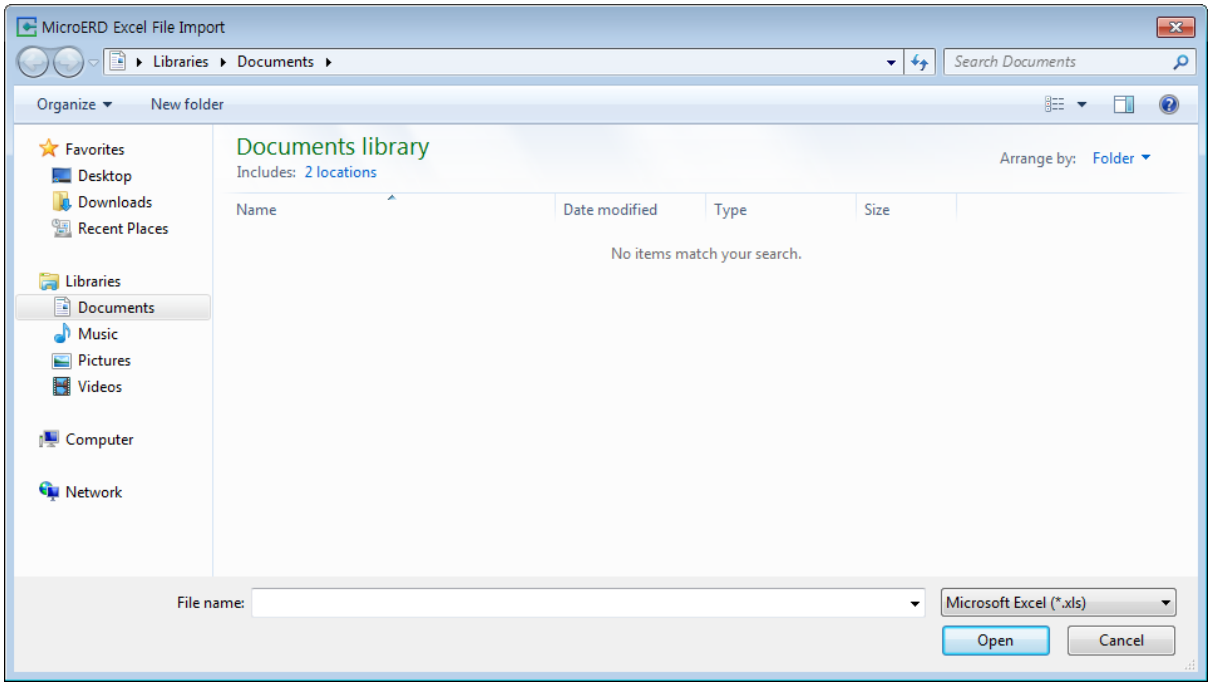


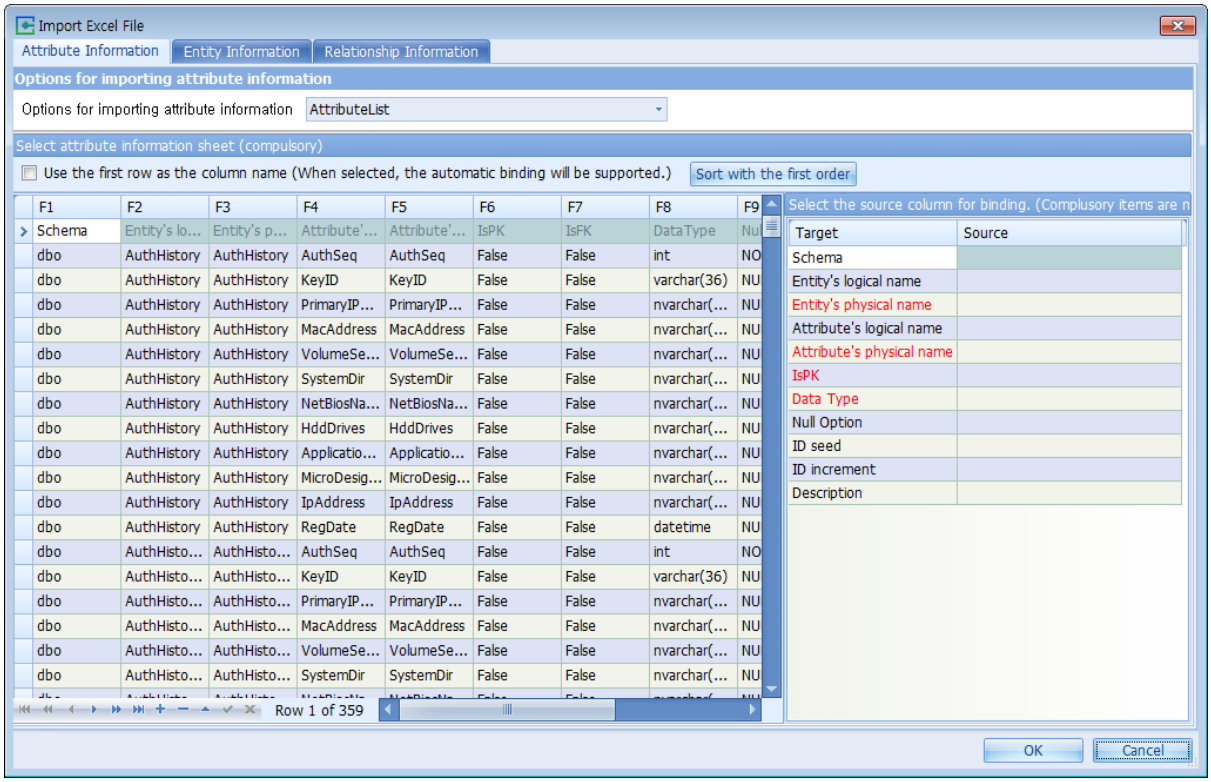
This function imports ERWin XML file into MicroERD™.

Select [Engineering Function] > [Import from ERWin XML File].

The Model Merge Window that appeared in Model Merge function will reappear. The remaining process is the same as that for the Model Merge process.

Import from Excel File



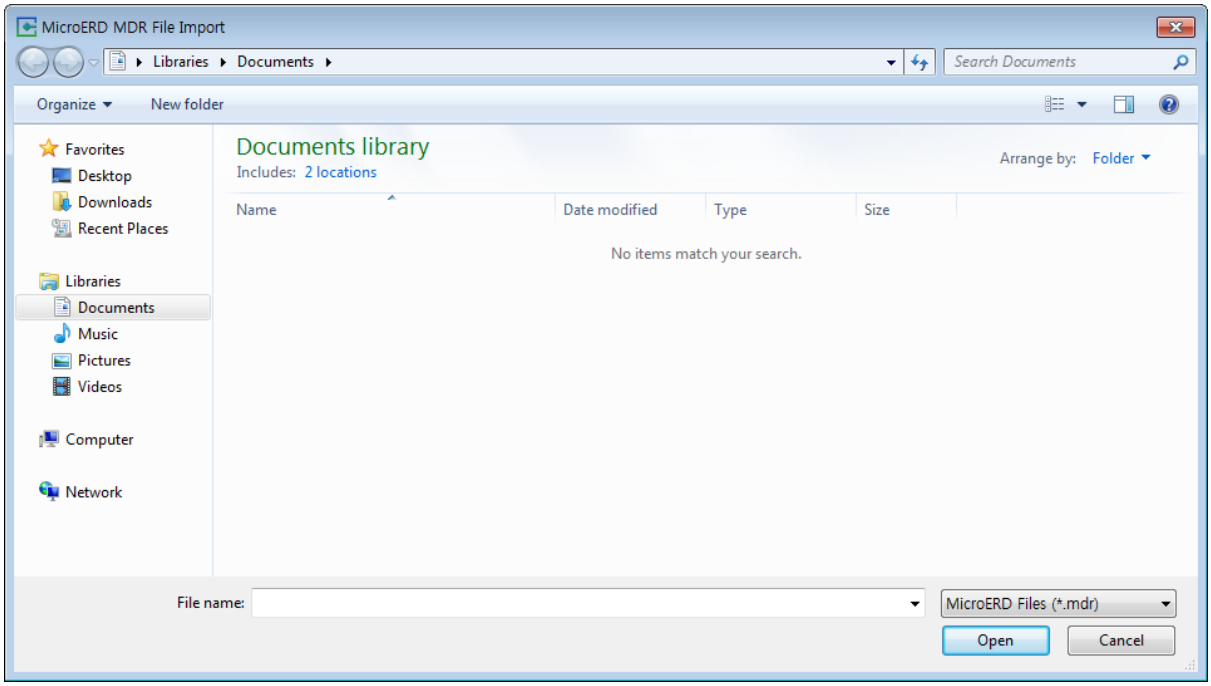

Import Excel File
Attribute Information
Entity Information
Relationship Information
Options for importing attribute information
Options for importing attribute information
AttributeList
Select attribute information sheet (compulsory)
Use the first row as the column name (When selected, the automatic binding will be supported.)
Sort with the first order
F1 F2 F3 F4 F5 F6 F7 F8 F9
Schema Entity's lo... Entity's p... Attribute'... Attribute'... IsPK IsFK DataType Nu
dbo AuthHistory AuthHistory AuthSeq AuthSeq False False int NO
dbo AuthHistory AuthHistory KeyID KeyID False False varchar(36) NU
dbo AuthHistory AuthHistory PrimaryIP... PrimaryIP... False False nvarchar(... NU
dbo AuthHistory AuthHistory MacAddress MacAddress False False nvarchar(... NU
dbo AuthHistory AuthHistory VolumeSe... VolumeSe... False False nvarchar(... NU
dbo AuthHistory AuthHistory SystemDir SystemDir False False nvarchar(... NU
dbo AuthHistory AuthHistory NetBiosNa... NetBiosNa... False False nvarchar(... NU
dbo AuthHistory AuthHistory HddDrives HddDrives False False nvarchar(... NU
dbo AuthHistory AuthHistory Applicatio... Applicatio... False False nvarchar(... NU
dbo AuthHistory AuthHistory MicroDesig... MicroDesig... False False nvarchar(... NU
dbo AuthHistory AuthHistory IpAddress IpAddress False False nvarchar(... NU
dbo AuthHistory AuthHistory RegDate RegDate False False datetime NU
dbo AuthHisto... AuthHisto... AuthSeq AuthSeq False False int NO
dbo AuthHisto... AuthHisto... KeyID KeyID False False varchar(36) NU
dbo AuthHisto... AuthHisto... PrimaryIP... PrimaryIP... False False nvarchar(... NU
dbo AuthHisto... AuthHisto... MacAddress MacAddress False False nvarchar(... NU
dbo AuthHisto... AuthHisto... VolumeSe... VolumeSe... False False nvarchar(... NU
dbo AuthHisto... AuthHisto... SystemDir SystemDir False False nvarchar(... NU
Row 1 of 359
Select the source column for binding. (Complusory items are n
Target
Source
Schema
Entity's logical name
Entity's physical name
Attribute's logical name
Attribute's physical name
IsPK
Data Type
Null Option
ID seed
ID increment
Description
OK
Cancel

This imports the model saved as an Excel file into MicroERD™.

You can create a model by mapping the model with an Excel Sheet and the column names.

Click the OK button and the remaining process is the same as that for the Model Merge process

Import from MicroERD™ File



This function imports the model previously created using MicroERD™ into the current model.

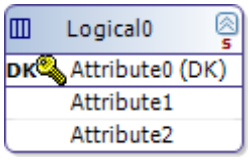
The process after importing *.mdr file is the same as that for the Model Merge process.

Functions for PDW/ Azure

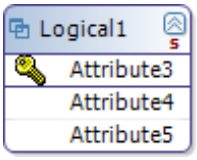
※ **Functions explained in this section are only available in MicroERD Professional for Azure/PDW edition.**

Types of Tables (Entities)

- Tables (entities) created in PDW or Azure are different from tables of RDB(Relational Database) like MS-SQL Server. They take one of two types of entities.
- There are two default table types, which are Replicated Table and Distributed Table.
- On the picture below, the left one is a distributed table and the right one is a replicated table.



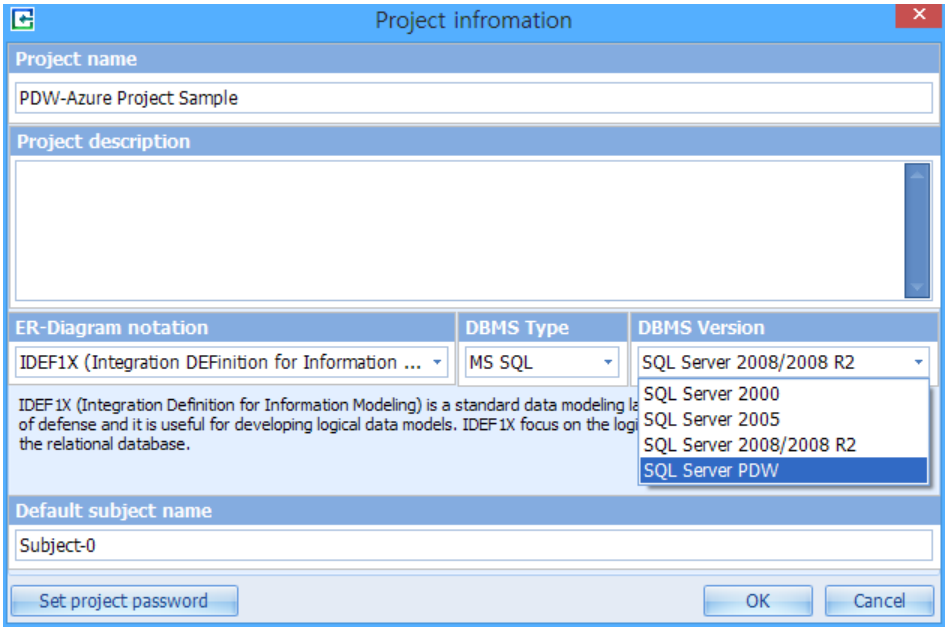
Distributed table



Replicated table

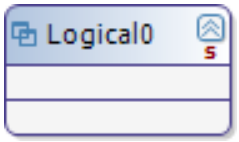
Create PDW/Azure Project

- A project for PDW or Azure can be created in the same way described in Create Project section by selecting SQL Server PDW.

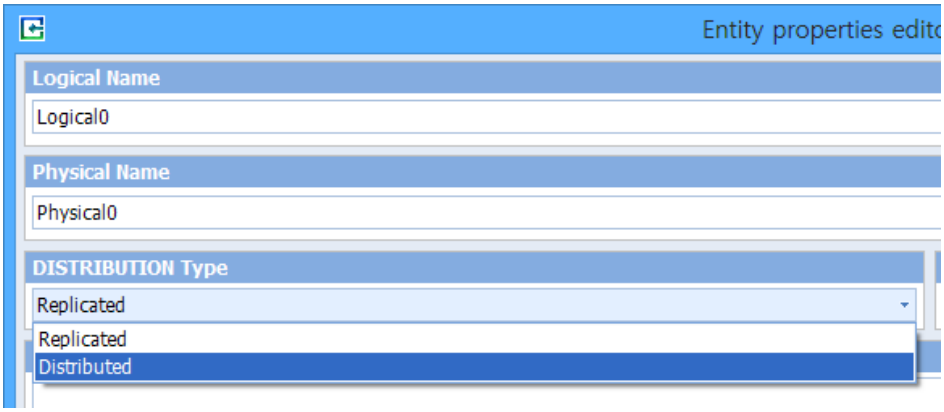


Create and Set up Entities

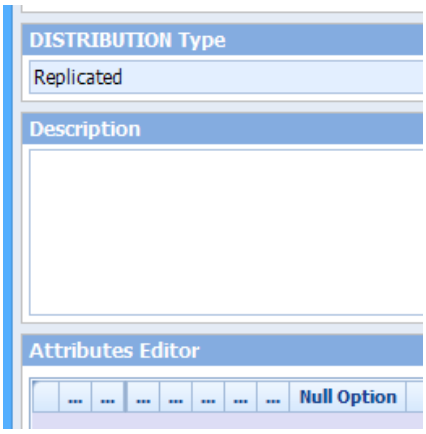
- An entity (table) can be created in the same way described in Create Entity section.
- An entity is created in a replicated type by default. It's a default value in PDW.

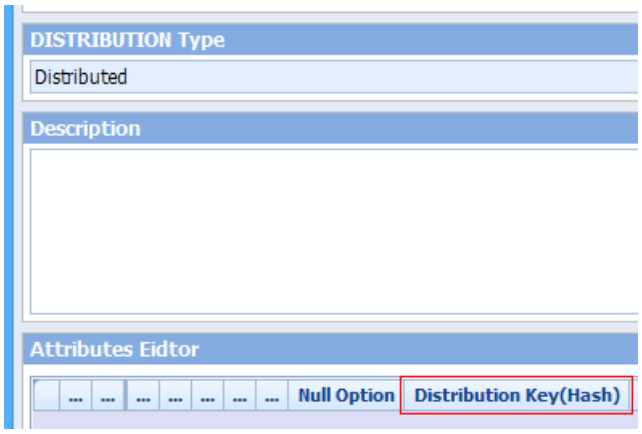


- You can convert the entity type into Distributed Table in the Property Window. Open the entity's context menu by right clicking and select Properties.

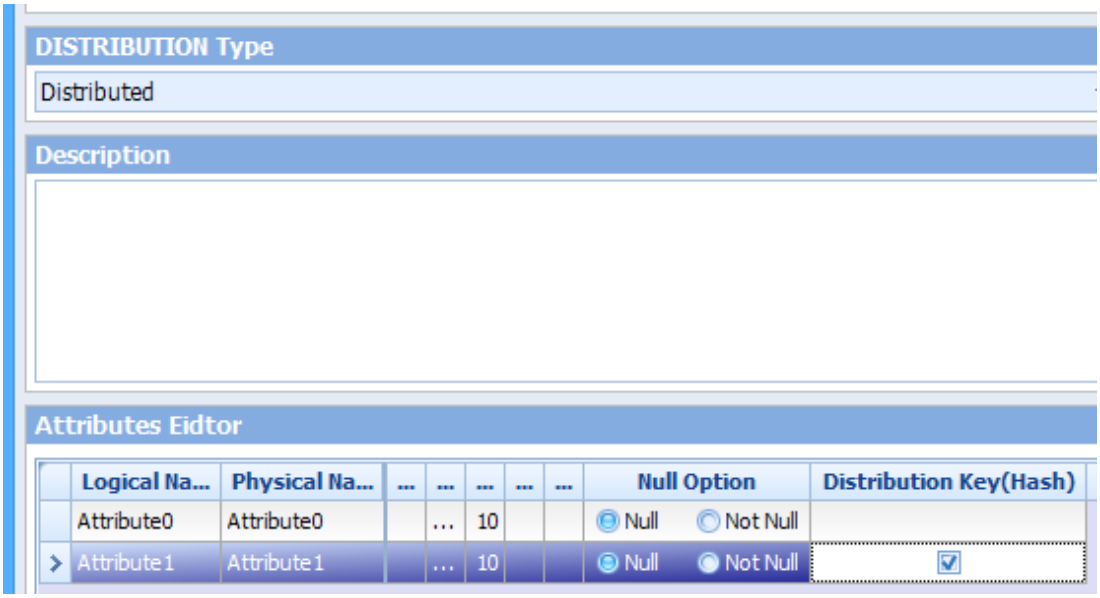


- In case an entity does not have any Distribution Key, its type cannot be changed to Distributed Table.
- If you choose Distributed, Distribution Key will be added in the Attributes Editor as below.



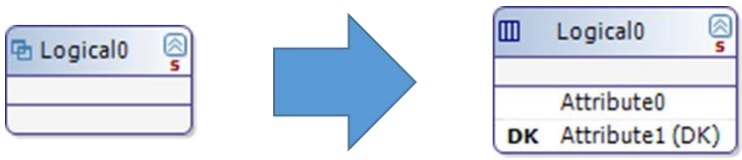


- It's because a distributed type table needs a specific condition. To satisfy that condition, one of attributes of an entity must be a distributed column by checking its Distribution Key (Hash) field as below.

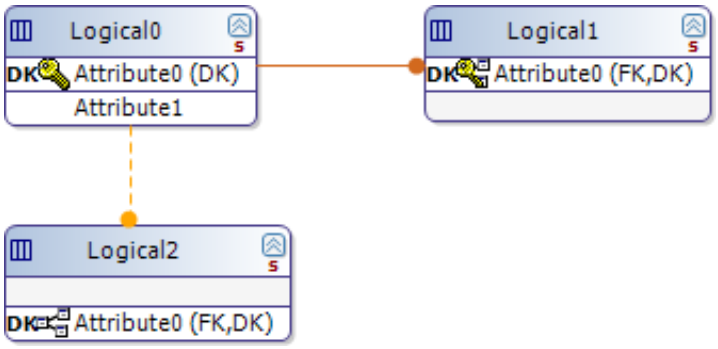


- After one attribute is set to a distributed column, Distribution Key(Hash) fields of other attributes cannot be checked to avoid a possible mistake.

- Once an entity type is set to a Distributed, its appearance will be changed as below.

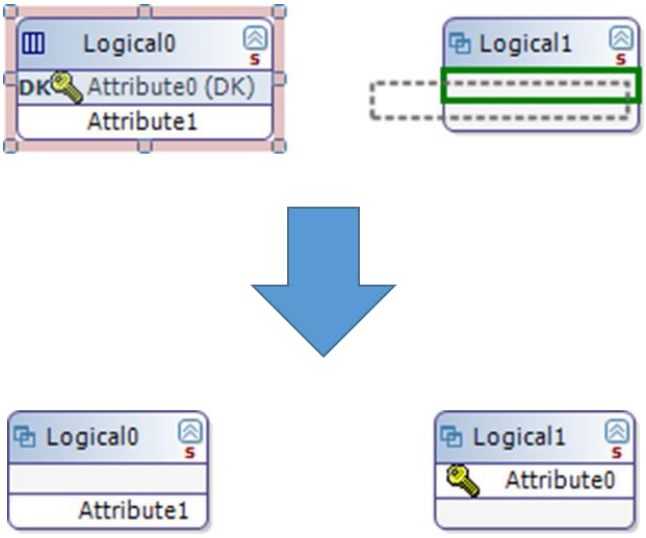


- The entity's icon changes and the distributed attribute is marked with **DK**. This mark will be applied to Primary Key or Foreign Key as well.



- If a distributed entity is copied, the copied entity will be also a distributed table.

- When a distributed attribute of a distributed entity is moved to another entity, the original entity will be converted into a replicated entity and the moved attribute will be changed to a general attribute. Check the picture below.

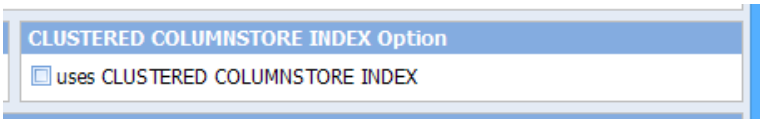


- Even if a distributed attribute is copied by clicking the Ctrl key to another entity, it will become a general attribute.

- If a distributed attribute is deleted, the original entity will change into a replicated type.

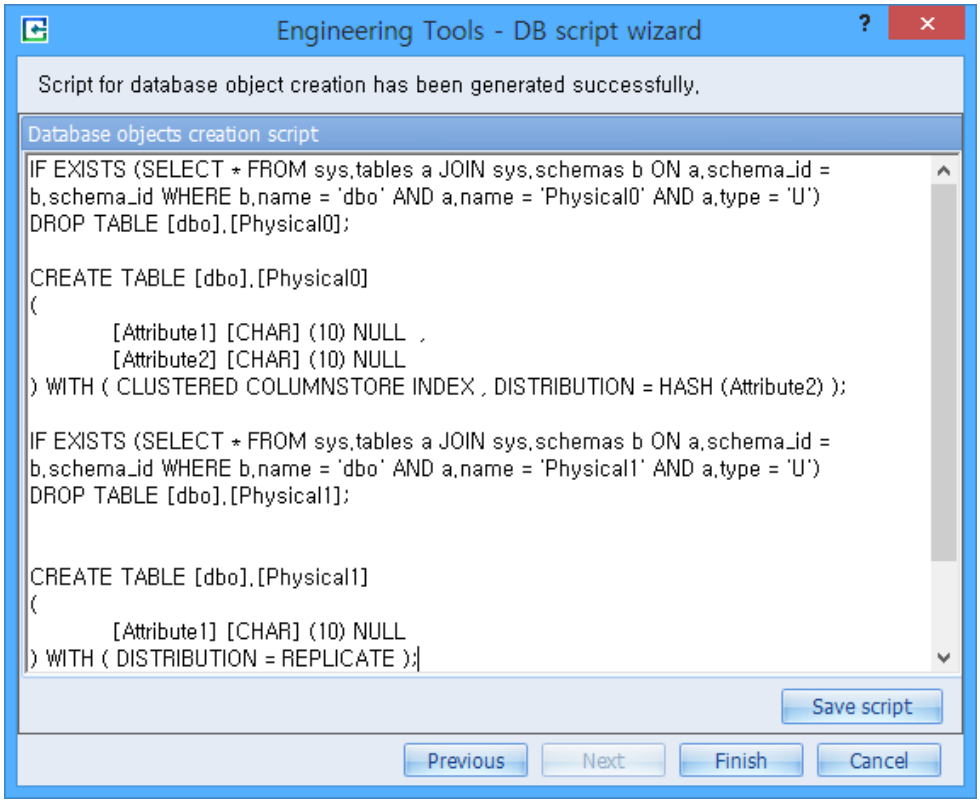
Options for PDW V2 Only

- One of an entity's property is CLUSTERED COLUMNSTORE INDEX Option.



- This option is used in PDW V2 only. If this option is selected, a table will be recognized as an Index in PDW V2.

Replicated, Distributed type SQL


Engineering Tools - DB script wizard
Script for database object creation has been generated successfully.
Database objects creation script
IF EXISTS (SELECT * FROM sys.tables a JOIN sys.schemas b ON a.schema_id = b.schema_id WHERE b.name = 'dbo' AND a.name = 'Physical0' AND a.type = 'U')
DROP TABLE [dbo].[Physical0];
CREATE TABLE [dbo].[Physical0]
(
[Attribute1] [CHAR] (10) NULL ,
[Attribute2] [CHAR] (10) NULL
) WITH (CLUSTERED COLUMNSTORE INDEX , DISTRIBUTION = HASH (Attribute2));
IF EXISTS (SELECT * FROM sys.tables a JOIN sys.schemas b ON a.schema_id = b.schema_id WHERE b.name = 'dbo' AND a.name = 'Physical1' AND a.type = 'U')
DROP TABLE [dbo].[Physical1];
CREATE TABLE [dbo].[Physical1]
(
[Attribute1] [CHAR] (10) NULL
) WITH (DISTRIBUTION = REPLICATE);
Save script
Previous
Next
Finish
Cancel

- [dbo].[Physical0] table is a distributed table. So you will see the phrase, DISTRIBUTION = HASH (Attribute2) on the script.
- In addition, you can find that this table will work as Index in PDW V2 because the CLUSTERED COLUMNSTORE INDEX option is inserted.
- On the contrary, [dbo].[Physical1] table script has the phrase, DISTRIBUTION = REPLICATE, which means this table is a replicated table.
- And there is no CLUSTERED COLUMNSTROE INDEX option in [dbo].[Physical1] script because the options is not selected. But you can set this option whether the table is a distributed type of replicated type. Once you select the option, the phrase, CLUSTERED COLUMNSTROE INDEX will be inserted in the table script.

Standardization

Domain

- Definition

  Domain is a set of effective values that the attribute values within an entity can have.

- Description

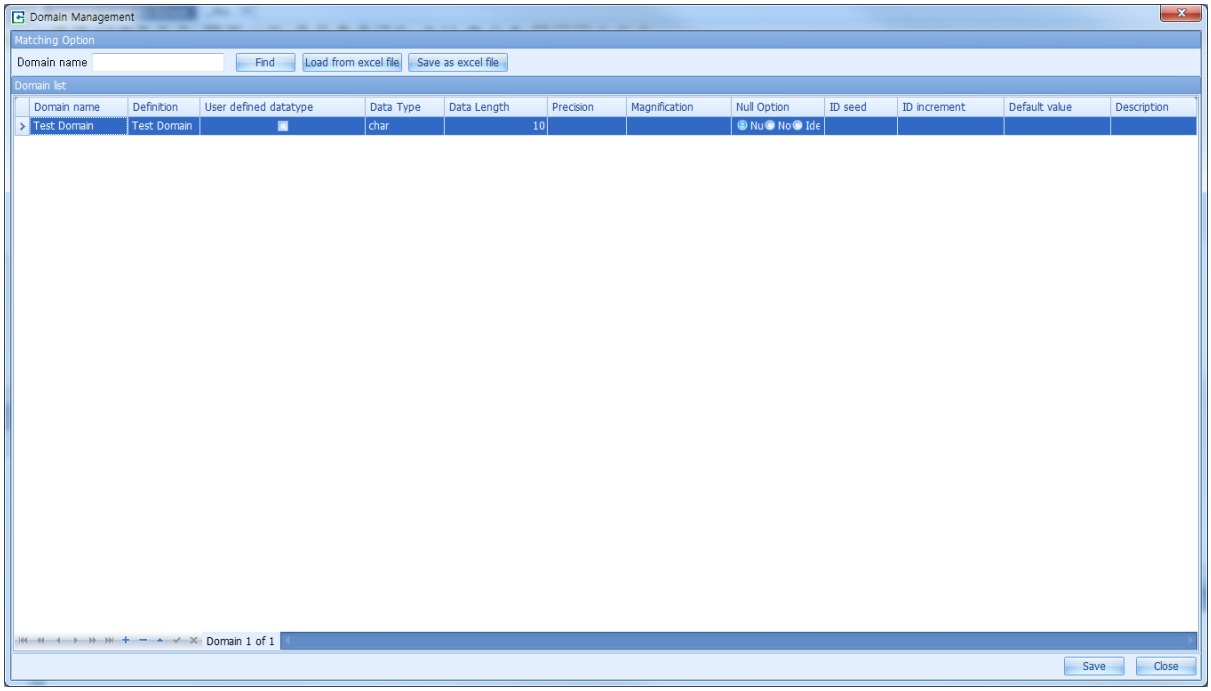
  Domain Definition refers to the determination of the data types, sizes or restrictions of attribute values.

  Usually, the type, size and so forth are directly designated in the attribute without defining the domain, but this can cause inconsistencies when it is used in the entity that has many attributes and changes have to be individually applied. When you define the domain, you can easily manage changes and prevent the error of designating types and sizes incorrectly.

- Example

  The attribute has telephone number data such as "Telephone Number of Person in Charge" and "Telephone Number of Center."

  If you create a domain called "Telephone Number" and set its data type to varchar () and the length to 20, the future attributes related to telephone numbers can be designated to this domain to set the data type as varchar (20).



Click [Standardization] > [Domain Management] to bring up the Domain Management Window.

Click the [+] button in the Add/Delete/Move Item menu to register a new domain.

If you check User Defined Data Type, you can view the list when you select the data type of the property in the **Edit Entity Property** window.

You can load the list of domains you created or save it to a file using Import/Export.

Add/Delete/Move Item menu has the following functions.

Item	Description
|◀◀	Moves to the very first page.
◀◀	Moves to the previous page.
◀	Moves to the previous item.
▶	Moves to the next item.
▶▶	Moves to the next page.
▶▶|	Moves to the very last page.
+	Adds an item.
-	Deletes an item.
▲	Edits the selected item.
√	Finishes editing.
×	Cancels editing.

.

Data Dictionary

- Definition

Data Dictionary stores the names for modeling objects such as subject area, entity and attribute in a way that they can be used throughout the project consistently.

- Description

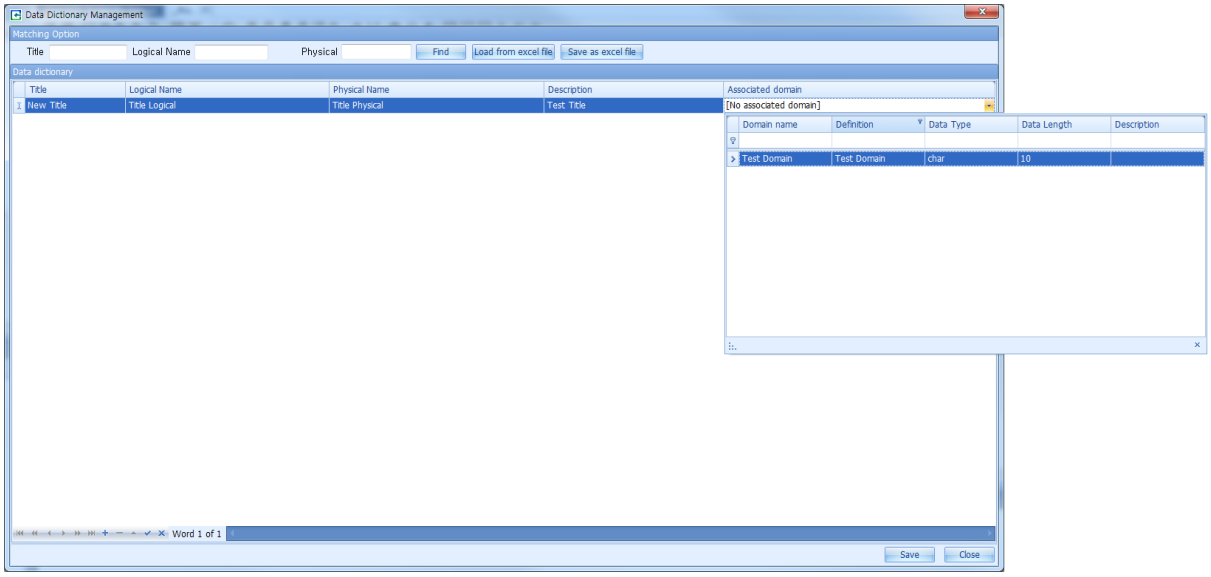
The Data Dictionary must include definitions about database related objects such as the entity, relationship, attribute, or work rules. The Data Dictionary supports consistent information system between the developer and users apart from supporting the developer to use terms consistently in the modeling stage.

- Example

Center: includes the concept of a warehouse where products are stored and the concept of a shop where products are sold.

Warehouse/Release (In/Out): An act of receiving products from the provider and storing it in the warehouse or returning products from warehouse to the provider.

Registering in Data Dictionary



Click [Standardization] > [Data Dictionary Management] to bring up the **Data Dictionary Management** window.

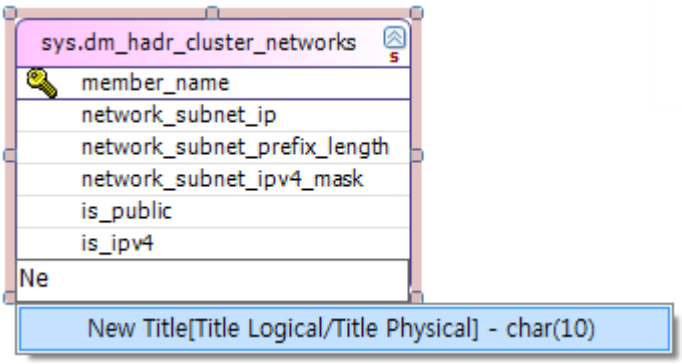
You can register a new data dictionary by clicking the [+] button in the Add/Delete/Move Item menu.

You can see the list of registered domains when you click the connected domain, and you can select a domain from the list.

The Add/Delete/Move Item menu can be used in the same manner as explained in the Domain

section.

Using Data Dictionary



Press the F12 key while you are entering the logical name of the attribute in the logical model to see the list of data including the corresponding term from the registered data dictionary.

Select the item you want from the list to set the attribute with the data type and length registered in the data dictionary.

Import from Excel File

Click [Standardization] > [Import from Excel File] to load the data dictionary and domain you exported previously.

You can only import files with the extension, .mds.

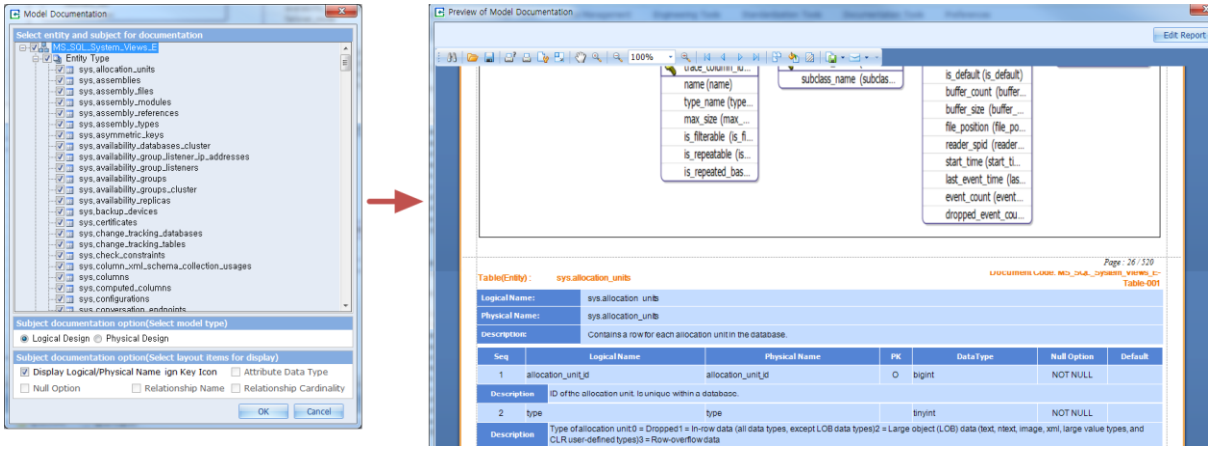
Export

Click [Standardization] > [Export] to export the domain and data dictionary you registered to a file.

The extension of the file created is .mds.

Documentation

Model Documentation

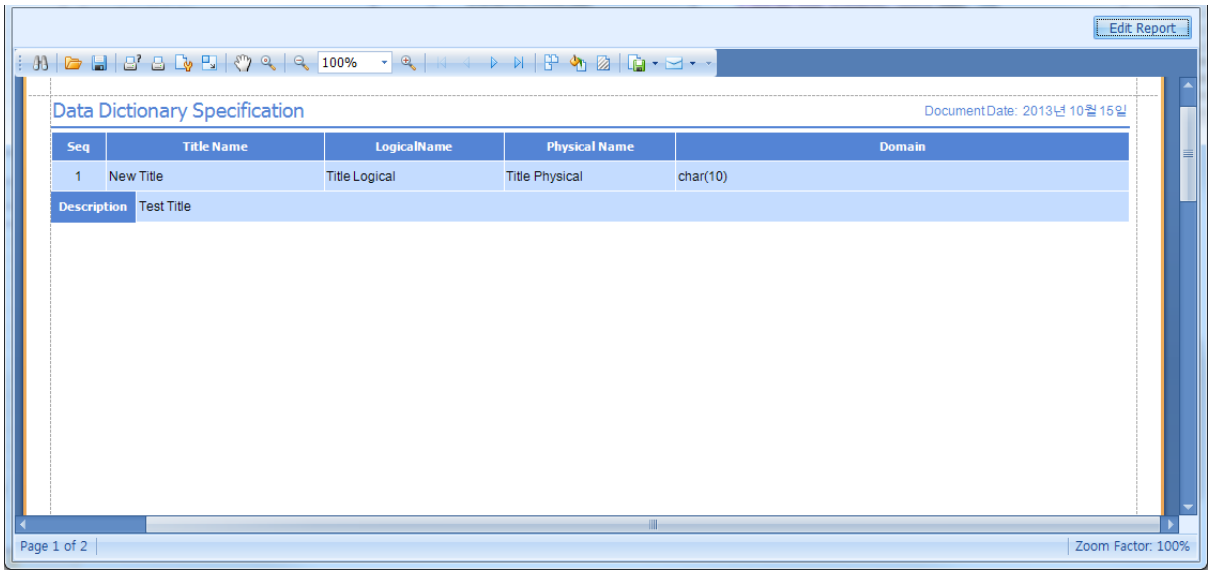


Click [Documentation] > [Model Documentation] to bring up the window to select an entity or a subject area.

Model type can be chosen from logical model/physical model.

For documentation options, "Logical/Physical Name" and "Foreign Key Icon" will be enabled when you choose Logical Design and all items will be enabled for selection when you select Physical Design.

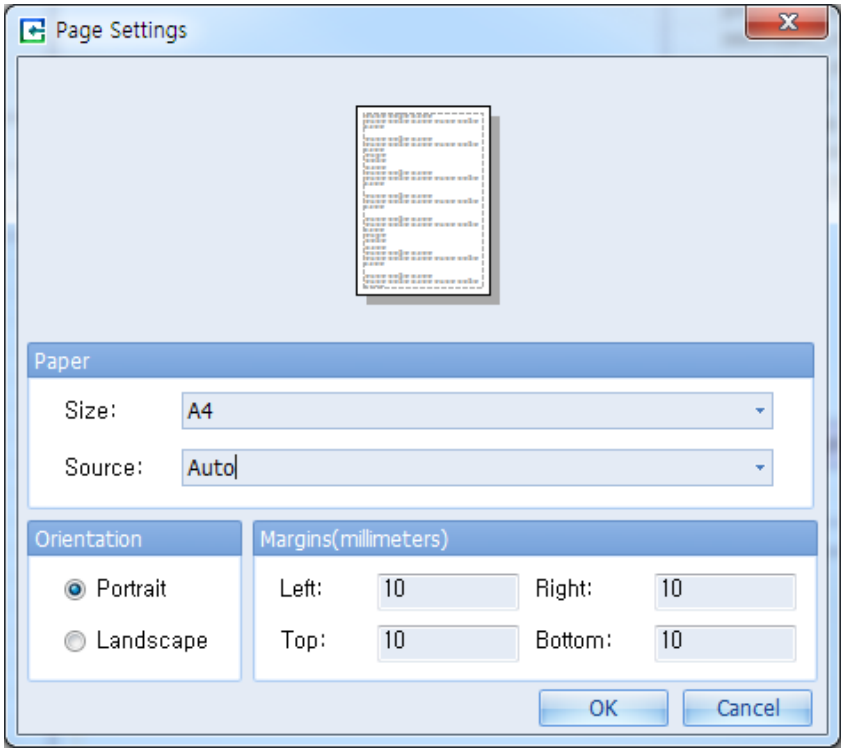
Standardization Data (Data Dictionary, Domain) Documentation



Click [Documentation] > [Standardization Data Documentation] to convert the registered domain and data dictionary into a document.

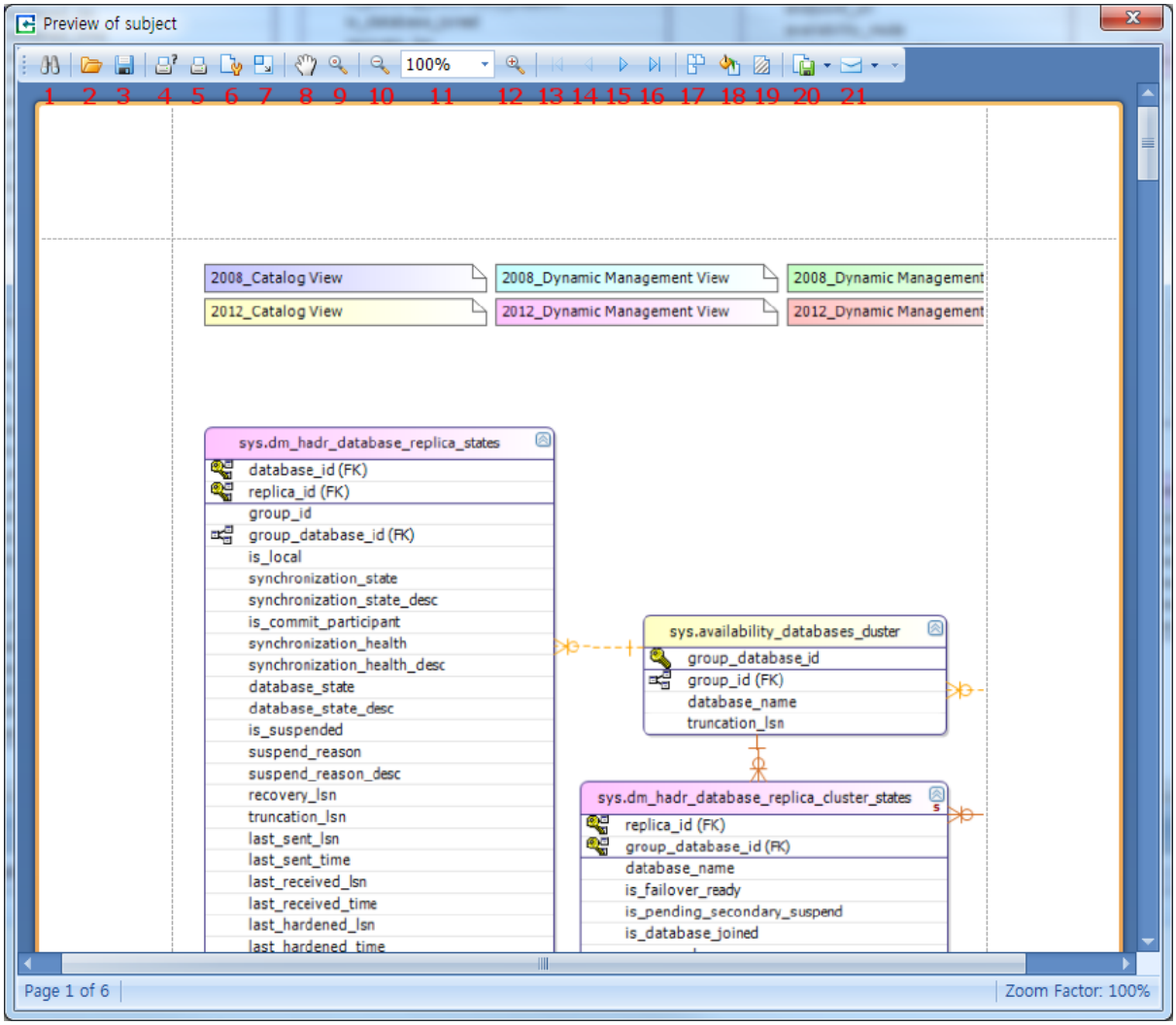
Print

Printer Page Settings



Click [Project Tools] > [Printer Page Settings] to bring up a window that allows you to choose the paper size, direction and margins.

Printing and Preview



Click [Project Tools] > [Print Diagram] to print out the document you see on the current window. You can also export it into a file or an image and add watermarks.

No.	Name of Tool	Description
1	Search	Enables text search.
2	Open	Imports a file to print. You can only import the file with the extension, prnx.
3	Save	Save the file to print. The file is saved with the extension, prnx.
4	Print	Brings up Print Window where you can choose the printer, pages to print, number of copies, etc.
5	Quick Print	Prints the document immediately based on default settings.
6	Page Setup	Sets the page to print.
7	Scale	Adjusts the size. You can choose to keep a fixed ratio or adjust to the number of pages.
8	Hand Tool	You can move the viewing area using the hand-shaped cursor.

9	Magnifier	Zooms in or out.
10	Zoom Out	Zooms out step by step each time you click.
11	Zoom	You can directly enter the magnification power or select it from the list to adjust the size.
12	Zoom In	Zooms in step by step each time you click.
13	First Page	Moves to the first page.
14	Previous Page	Moves to the previous page.
15	Next Page	Moves to the next page.
16	Last Page	Moves to the last page.
17	Multiple Pages	Sets the number of pages to view at a glance in the preview window.
18	Color	Sets the background color.
19	Water Mark	Sets the water mark. You can set either text or image type watermark.
20	Export Document	Exports the document into a file. You can export as PDF or BMP files.
21	Send Via E-Mail	Exports the document to e-mail.